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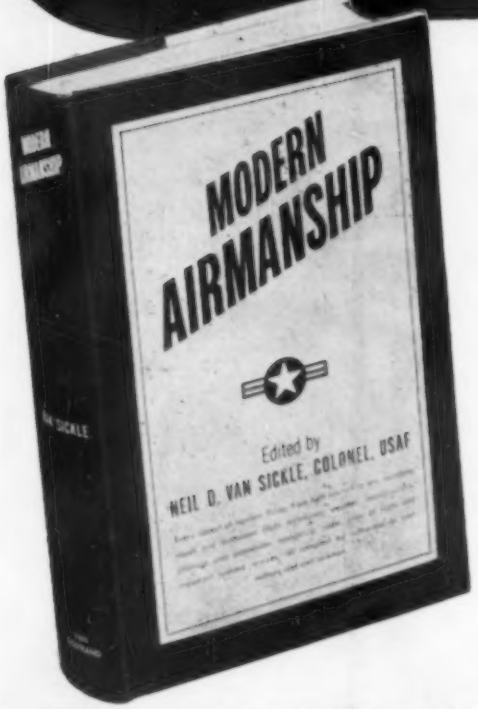

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FEBRUARY, 1958 VOLUME 62, NUMBER 2

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The new airport at Sedona, Ariz. (see page 56) provided a rugged background for Don Downie when he photographed pilot Tom Patton of the Norman Larson Co. with a new Beechcraft Bonanza.

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Ziff-Davis Publishing Company Editorial and Executive Offices
One Park Avenue, New York 16
Branch Offices: 64 E. Lake St., Chicago, Ill.
Room 412, 215 West 7th Street, Los Angeles 14, California

ZIFF-DAVIS PUBLISHING CO., One Park Avenue, New York 16, N. Y. William Ziff, President; H. J. Morganroth, Vice President; Michael H. Froelich, Vice President; Michael Michaelson, Vice President and Circulation Director; Albert Gruen, Art Director.

CONTRIBUTIONS: Contributions should be mailed to the New York Editorial Office at One Park Avenue, New York 16, N. Y., and must be accompanied by return postage. Contributors are advised to retain a copy of their manuscripts and illustrations. Contributions will be handled with reasonable care; but this magazine assumes no responsibility for their safety. Any copy accepted is subject to whatever adaptations and revisions are necessary to meet the requirements of this publication. Payment covers all author's, contributor's and contestant's rights, title and interest in and to the material accepted and will be made at our current rates upon acceptance. All photos and drawings will be considered as part of the material purchased.

SUBSCRIPTION SERVICE: All subscription correspondence should be addressed to Circulation Dept., 64 E. Lake Street, Chicago 1, Ill. Please allow at least 4 weeks for change of address. Include your old address as well as new—enclosing if possible an address label from a recent issue of this magazine.

SUBSCRIPTION RATES: One year U. S. and possessions and Canada $4.00; Pan American Countries $4.50; all other foreign countries $5.00.

FLYING is published monthly by the Ziff-Davis Publishing Company. William B. Ziff, Chairman of the Board (1946-1953), at 64 E. Lake St., Chicago 1, Ill. Entered as second-class matter Sept. 8, 1942, at the Post Office, Chicago, Ill., under the act of March 3, 1879. Authorized by Post Office Department, Ottawa, Canada, as second class matter.

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MAILBOX

RADIO FREQUENCIES

Hurrah, congratulations and thanks to Mr. Elston Swanson on his article "Radio Frequencies" in the November issue of FLYING.

Sputnik I and Sputnik II are still a mystery to me and also a lot of things pertaining to flying, but now HF, VHF, and Omni are much clearer.

Being a student and only flying light planes with limited radio facilities (LF and none at all), Mr. Swanson's article has enlightened me greatly and no doubt will help me when I take my test for Private this month.

J. J. BUTCHER
Warren, Ohio

LEGISLATION WON'T CREATE BRAINS

I wish to oppose the suggestions to require instrument time for private pilots, or even that all licensed aircraft be equipped with operating primary panel.

Of course it is obvious that many private pilots need more respect for instrument weather, but neither instruction nor equipment can guarantee judgement.

Instruction for private pilot's license should be designed to alert the non-instrument pilot to the potential hazards but he need not necessarily become an instrument pilot. Such a requirement would simply force more people out of private flying. There are already few who can fly purely for pleasure, or private reasons, unless they have some gimmick to make it "deductible." Why should the pleasure pilot suffer such additional penalty?

I further disagree with Mr. Owen's observations (FLYING, "Mailbox" Nov. '57). In my own experience as an executive pilot I have found myself unintentionally on instruments while pushing to make a destination with no instrument approach facilities—but I had "Full Panel," two engines, two omnis, two ADF's and 40 transmitting frequencies.

However, when flying with friends or members of my family in the Piper J-5 of which I'm a half owner, I've never been caught. Neither do I expect to be.

Let's face the facts: instrument weather *can* be avoided if one is willing to first avoid a marginal situation. Legislation won't create brains.

HERMAN H. STUBBLEFIELD
Cleveland, N. C.

END OF THE LINE

Of particular interest was your article "End of the Line" on Ascension Island. I recently had the experience of visiting this barren outpost, now known as Ascension Auxiliary AFB. As you mentioned, the island is pancaked and pimpled with many volcanic cones and craters, the only area of vegetation being the 2,800-foot extinct volcano in the center of the island.

As we descended for a landing, we had difficulty in locating the field and, not until we had passed directly over the field, were we able to locate it amid the volcanic cones. Upon landing we were again surprised. We found we were traveling uphill until passing over the middle where the runway sloped downhill at a fairly steep angle to the ocean. The center runway was carved between two sharp cones and it appeared that the wing tips of our Globemaster had just enough clearance. This unique runway, coupled with the fact that the wild donkeys and sheep which also inhabit the island have been known to stroll across it at inopportune times, makes any visit to Ascension Island by air a little more than routine.

I/LT. R. BLAIR FINLAY
Larson AFB, Washington

MISPLACED PHOTO

In the November issue of FLYING on page 60, fourth paragraph in an article entitled "Squall Line Weather," the author, Mr. Reber, says, "a picture with this article shows the hail damage that is possible."

The picture is in the back of whose

drawer? It wasn't in the magazine.

WILLIAM C. WRIGHT
Wilmington, Ill.

• *We sent out a search party, found the missing photo—not saying where—and here it is.*—Ed.

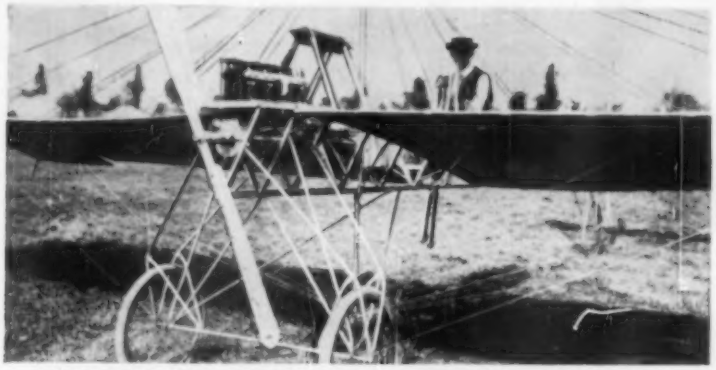
QUITE LIKELY AN OVERSIGHT

Although I am a long-time subscriber to your magazine my copies are piling up at home. Consequently I buy FLYING wherever and whenever I can. About a week ago I picked up the June and July issues at Bahrein Island, Persian Gulf, and, in the July issue in the article "Golden Rule Airport" I read that Barstow is midway between San Francisco and either Phoenix or Winslow. It also says this is the *only* gas stop before reaching Los Angeles from Las Vegas."

What, may I ask, about Daggett-Gentry

(Continued on page 8)

The Many-Sided Career of Early Bird Robinson



Building this 30 h.p. plane in 1908 led to Robinson's meeting with Glenn Curtiss and a long association with this great aviation pioneer.

This early sport plane, designed and built in 1915 by Robinson, attained 81 m.p.h., weighed only 600 pounds.

Hugh Robinson (far left) at the launching of an early Curtiss hydroplane at San Diego in 1911. Glenn Curtiss, designer, is at far right.

Hugh Robinson's skill as a flyer was enough to win him lasting aviation fame; but when you add his abilities as a designer and builder of aircraft, you complete the picture of a many-talented man.

Robinson built a one-cylinder automobile in 1896, a dirigible in 1906 and a tractor-type monoplane in 1908. This airplane led to his meeting Glenn Curtiss. For many years afterward, Robinson helped Curtiss design, build and fly the early and famous Curtiss aircraft.

Robinson was a famous early-day exhibition flyer, making more than 900 appearances here and abroad. He was among the first to fly air mail, making a mail run between Minneapolis and Rock Island, Ill., in 1911. He demonstrated a pioneer dive bombing technique with grapefruit "bombs" in California; operated a flying school in France, and built a sport plane that weighed only 600 pounds.

Altogether, Robinson flew more than 3,000 hours in compiling a useful and enviable record as a daring and resourceful airman.

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MAILBOX

(Continued from page 6)

about 8-10 miles SE of Barstow and about four miles NW of the CAA emergency field and radio at Daggett? Gentry has gas, lighted runway and a light-controlled glide slope approach system. I landed there about a year and a half ago and it had only been opened a short time.

Perhaps it has closed in the interim, or perhaps the authors just accidentally overlooked Paul Pierce's neighbor?

JOHN A. WILLIFORD
1st Engr., USNS Tallulah
Gulf of Aden

• *According to latest Airport Directory Daggett-Gentry (on L.A. chart) is still in operation with Ernie Gentry as manager. 80/87 octane gas is available.*—Ed.

A PLACE IN THE AIRMAN'S WORLD

I have just read through The Airman's World by Gill Robb Wilson (Random House, publishers) for about the twentieth time. To explain its effects on me is a task far beyond my ability.

There are many people who would insist upon regarding Mr. Wilson's work in a realistic sense only. They would say that such inspirational works were written in the interest and for the promotion of aviation. If this were his only purpose, I am sure The Airman's World has served it well. However, I feel very deeply that Mr. Wilson had a far greater purpose, for he is a far greater man—a man whose purpose reaches not only into the future of aviation, which is admirable within itself, but also into the welfare of his fellow man and even further into the welfare of future generations and the future of his country.

I offer my most sincere appreciation to Mr. Wilson for the prominent role he has played in helping me to establish a life's goal. He is a man whom I will remember along with my parents, pastor, Sunday school teachers, public school teachers, and flying instructor.

I am a sophomore at the University of North Carolina. I received my private license last Spring and now have accumulated approximately 100 hours, of each of which I am very proud. At present, I am attempting along with many others I am sure—to find a way to join the ranks of aircraft owners. In the future, after completing French, history and all those courses so necessary in understanding one's society, I have high hopes that I will be worthy of finding a place in the airman's world.

J. SHERWOOD THOMPSON
Chapel Hill, N. C.

AIRCRAFT MODEL 24W41A

I am very interested in getting in touch with any owners of "Fairchild Argus"—aircraft model 24W41A—with a view to swapping notes.

We have in England only a very few of these aeroplanes although I feel that there must have been a very large number of them manufactured and many of them must still be in service in various corners of the world . . .

May I, at this point, compliment you on your journal which is undoubtedly the most satisfying publication for the private owner and light-weight aircraft operator.

E. F. ALLCHIN, *Mgr. Director*
E. F. Allchin & Co. Ltd.,
253 Bordesley Green,
Birmingham 19, England.

CHARMED

"And There was Light" (November FLYING) is the most delightful thing I have read in many moons. I read it over every once in a while, and get a new chuckle each time.

Also, I enjoyed the article on test flying the "Champion." I had the privilege

of inspecting the Traveler recently, and have drooled at the Champion ever since.

However, my bankroll says: stick to the J-5; if you can buy fuel for it, you will do well.

B. D. MCKAY
Asheville, N. C.

I have just read "And There Was Light" (by "Anonymous") in your November issue of FLYING.

This may sound silly to you, but my husband says he wrote it. How many other husbands have said the same thing! I don't believe he wrote it and, to settle a bet, don't tell me who wrote it just tell me did my husband write it. His name is . . .

Let me add there are a lot of women who enjoy your magazine very much and I happen to be one of them!

Thanks in advance (Please don't use my name either.)

MRS.....

• *This may cost us a male reader, but to our lady reader in that northern Pennsylvania oil city, the answer is No. Your better-half has been pulling your landing gear.*—Ed.

TIMELY EDITORIALS

. . . Of great interest have been the timely editorials concerning American youth and aviation. Recent testimony in Washington by General Curtis LeMay serves to point this up. Military aviation apparently cannot hold the interest of American youth. . . . This country would do well to consider all ways of fostering interest in aviation, and do it soon. It might be as good an investment as some of the foreign aid funds we have squandered.

R. A. MACGREGGOR
Minneapolis, Minn.

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Briefings . . .

JUST ANOTHER JOB for the helicopter and the British-made "Whirlwind" was successful in its assigned task. In a test to show the value of big helicopters in salvage work, this 'copter from the Naval

Air station at Lee-on-Solent, England, flying 30 feet above the water with a towline of about 160 yards, made the grade by towing the Gavington, a 360-long-ton minesweeper.

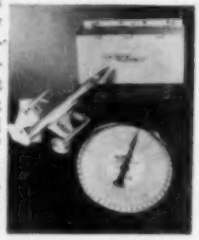
A HEALTHY INCREASE in the number of pilot certificates and other airman licenses during the first six months of 1957 is apparent in CAA's latest report. Overall increase, over the same period for 1956, in the pilot categories was 62 per cent; in the non-pilot, 13 per cent. Student pilot certificates totaled 39,006; Private pilots, 12,134; Commercial, 16,479 and Airline Transport, 2,643. While Mechanics' certificates fell off three per cent, new Control Tower Operators licensed totaled 1,930—a 65 per cent increase.

ON THEIR WAY TO the Antarctic and four months of serving as full-time members of the AF task force on Operation Deep Freeze III, based at McMurdo Sound, CAP cadets Wm. George Ehrlich (right), Lincoln, Neb. and George P. Schaeffer, Camas, Wash. stop over at

Washington, D. C. for a briefing from Gen. Curtis LeMay, AF Vice Chief of Staff. Selected from 36,000 cadets to represent the CAP on the Antarctic expedition, the boys will take part in several supply missions over the South Pole.

THE FIRST FRENCH AIRCRAFT in 20 years to be sold in the U.S.A. and quite likely the first jet ever to be sold for private use is on order through Beech Aircraft for Henry Timken, Jr., Detroit. board chairman and executive v.p. of Timken Roller Bearing Co. The plane—a four-place twin engine model—is the Morane-Saulnier MS 760, powered by two 880 lb-thrust Turbomeca Marbore II engines, with a top speed of 410 mph. A second plane is on order for Beech, with an additional eight on option.

MOST WIDELY KNOWN for the manufacture of hearing aids, the Sonotone Corporation is now at work on a $3.4 million contract on its radically new stainless steel-encased nickel-cadmium, lightweight battery. The present contract is divided between the USAF for B-47 installations; Lockheed for the F-104's; and Capital Airlines for its Viscounts. The steel for these batteries is supplied by the Republic Steel Corporation.



A DEVICE, weighing only 0.27 lbs. which is designed to unlock a jammed landing gear by means of a propellant-energized emergency uplock actuator, is being manufactured by the Propellex Chemical Corp., Edwardsville, Ill. A supplement to present hydraulic and pneumatic systems used on both commercial and military aircraft, the actuator, for which patent is pending, has been successfully tested on the McDonnell F101 Voodoo.

BOEING is replacing its previously announced Model 717 with an advanced type short to medium range jet transport designated the Model 720. The new design, powered with the higher thrust version of the P&W JT3(J-57), will accommodate 100 to 125 passengers and will have a top speed of 600 mph. United Air Lines has already placed an order for 11 of the 720's, first deliveries of which are scheduled for 1960.

ELEVATED TO THE STATUS of a scheduled overseas certificated airline, Trans-Caribbean Airways, the first supplemental carrier to be so certificated, is inaugurating full-scale passenger and cargo schedules on its assigned route from New York to San Juan, P.R. The CAB certification gives Trans Caribbean an equal right with Pan Am and Eastern to develop traffic on this route.

ENROLLEES AT THIS COLLEGE are an especially selected group of young ladies from all sections of the U.S.A., Canada and Mexico. It is American Airlines' new Stewardess College dedicated recently by Rep. Sam Rayburn (D-Tex.) and the first

built by any airline. Located on a 22-acre campus between Dallas and Fort Worth, this college, with all the comforts in the world including swimming pool and air-conditioning, is equipped to train as many as 1,000 stewardesses annually.

ONE OF AVIATION'S HIGHEST HONORS, the Daniel Guggenheim Medal "for notable achievements in aviation," has been awarded to Arthur E. Raymond, engineering vice-president of Douglas Aircraft. Presentation of this award for 1957 was made in New York at the recent Honors Night dinner of the Institute of Aeronautical Sciences. Mr. Raymond has been with Douglas since 1925 and the company's engineering head since 1936.

FREEHAND FLIGHT," an informative sales brochure on Federal Tubeless Autopilots, may be obtained by writing to the Industrial Products Div. of International Telephone & Telegraph Corp., 15191 Bledsoe St., San Francisco, Calif.

ANOTHER FIRST in aviation was recorded in late October when a twin-engined Learstar manufactured by Pacific Airmotive at Santa Monica, Calif., made the first trans-Polar flight by a business aircraft from Los Angeles to Dusseldorf, Germany. With only one refueling stop—at

Frobisher Bay—the 6,000-mile trip was completed in 23 hrs. 58 min. Aboard the plane were (l. to r.) John Dohm, navigator; Vernon Benfer, PacAero prexy, passenger; Wilhelm Roemerscheidt and Hal Herman, pilots.

POWDER BOMBING," usually associated with kid Halloween pranks, has been adopted by Pipe-line patrol pilots as a unique way to mark pipe-line leaks. Spotting a leak, the pilot aims a pound of

(Continued on page 98)

FLY WEATHER-WISE

These weather items prepared in consultation with the United States Weather Bureau

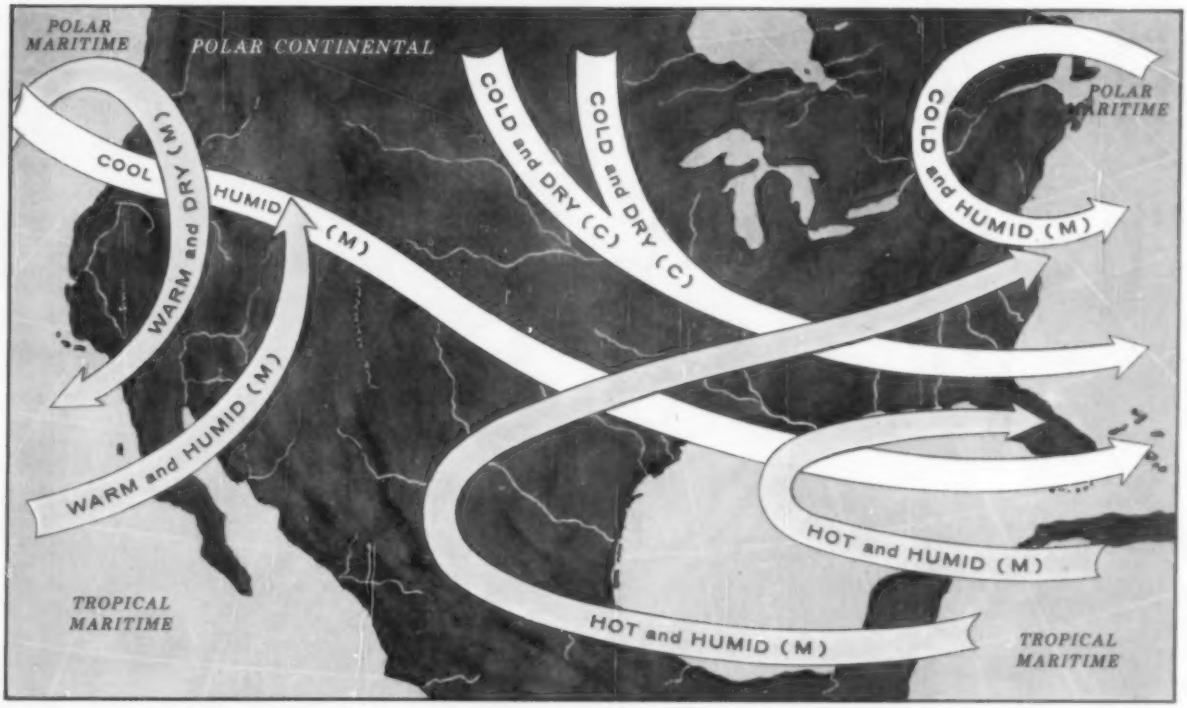


Chart shows typical paths and initial condition of Air Masses entering United States

AIR MASSES

Diagram above shows the major air masses moving into the United States. Broadly speaking, they fall into two categories: Polar and Tropical. Each has certain weather characteristics associated with it.

Polar Air Masses generally move over increasingly warmer surfaces and become unstable, so their weather is characteristically showery. Depending on amount of moisture encountered, they form cumulus-type clouds, rain or snow showers and often bumpy air at low levels.

Tropical Air Masses moving from warm source regions are cooled from below and become stabilized. Stratified clouds like Stratus or Fog are formed. When this moist air meets colder Polar Air, it will ride up over cold front, producing showers and thunderstorms.

Properties of air masses from standpoint of flying during winter season

AIR MASS	CLOUDS	CEILINGS	VISIBILITIES	TURBULENCE	SURFACE TEMPERATURE F.
cP (near source region)	None	Unlimited	Excellent (except near industrial areas, then 1-4 miles).	Smooth except with high wind velocities.	-10 to -60.
*cP (southeast of Great Lakes)	Stratocumulus and cumulus tops 7,000-10,000 feet.	500-1,000 feet, 0 over mountains.	1-5 miles, 0 in snow flurries.	Moderate turbulence up to 10,000 feet.	0 to 20.
*mP (on Pacific coast)	Cumulus tops above 20,000 feet.	1,000-3,000 ft., 0 over mountains.	Good except 0 over mountains and in showers.	Moderate to strong turbulence.	45 to 55.
mP (east of Rockies)	None	Unlimited	Excellent except near industrial areas, then 1-4 miles.	Smooth except in lower levels with high winds.	30 to 40.
mP (east coast)	Stratocumulus and stratus tops, 6,000-8,000 feet.	0-1,000 feet	Fair except 0 in precipitation area.	Rough in lower levels.	30 to 40.
mT (Pacific coast)	Stratus or stratocumulus.	500-1,500 feet	Good	Smooth	55 to 60.
mT (east of Rockies)	Stratus or stratocumulus.	100-1,500 feet	Good	Smooth	60 to 70.

*Source of Polar or Tropical air is indicated by a prefix "C" for continental and "M" for maritime.

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The SKYLANE offers you the same high performance (plus additional speed), the same outstanding stability and Land-O-Matic handling ease as its sleek and powerful sistership—the great new Flair-Flight Cessna 182 for 1958. Plus the rugged all-metal construction, economy, and reliability so well proven throughout the big and powerful 180-182 line.

Prices (std. equip., f.a.f. Wichita) begin at $13,850 for the 180 and $14,350 for the 182. See your nearby Cessna dealer (Yellow Pages of phone book) or write CESSNA AIRCRAFT COMPANY, Dept. F-21, Wichita, Kansas.

Inquire about Cessna lease plans

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HANGAR FLYING

LOOK BEFORE YOU LEAP

WHILE stationed in Tucson, Ariz., with the USAF, I met a lieutenant who had a PT-23 Fairchild for sale. Having no idea what the plane looked like, and the price being right, I bought it sight unseen. Soon after a short furlough in New York and an anxious trip back to Kansas, I arrived at a small farm airport near Kansas City, where I found my future in the sky—about twice as large as anything I had ever flown and three times more powerful, as well as tattered, torn and without brakes.

Finding that no one at the airport could fly the aircraft, I proceeded to check myself out with some helpful suggestions from an old timer and an airport mechanic. Two controlled crash landings and 20 minutes later I was airborne, supposedly headed southwest on course for Augusta, Kan., my first stop. Not knowing that the compass was in error, I found myself lost some three hours later in south Kansas, and low on fuel. After circling numerous water tanks and frantic searching on my map, I found my position was somewhere near Elkins Falls, Kan., about eighty miles off course. Seeing an emergency field located nearby on the map I circled its location only to find a reservoir now in its place. After numerous selections, I picked a narrow strip adjacent to a dirt road and close to a farmhouse. One low pass for a close look and over the fence we came, full flaps and no brakes.

Climbing out and walking over to the farmhouse, my only greeting was a barking dog. After waiting what seemed an eternity, a car came down the dusty road with a happy family on their way to a picnic. A quick explanation of my troubles brought me no relief and no gas but the gentleman was more than obliging to help me start the airplane, though his knowledge was lacking. Since the engine had a hand starter, I let him crank it.

Twenty minutes later a weakened, tired form leaning on the wing was just able to whisper, "The doctor told me I have heart trouble and shouldn't over-exert myself." Learning this, I decided we should change places. With much coaxing I left my helpful friend standing up on the wing with a meager knowledge of the aircraft's instruments and starting procedure. He elected to stand outside on the wing for fear he would be caught inside this bomb.

Another twenty minutes later, I lay prostrated on the wing also. I can remember my whispered instructions, "Crack the throttle if it starts." With a last burst of energy and a fast resounding turnover, I heard the engine catch. In a blast of air the airplane, with wide open throttle, plowed me into the ground and ran over me. I came up running as fast as I could and had to hurdle over my friend as he came bouncing off the wing. In less time that it takes to tell, the ship was nearly airborne on its own. In desperation, I leaped and landed on the rear cockpit, legs dangling in the air stream, whistling across the field.

Having never been in the rear cockpit, I gave no thought to cutting the throttle, but only to get up front. With my last ounce of energy, I got on the wing and to the front cockpit, just as we came over a slight knoll and started down a steep hill.

Dead ahead, coming up the hill, was a herd of cows and a lake just below. I pulled the throttle but never got in. I literally and physically flew through the herd of cows. The lake was coming up fast, but here lady luck put the right gear in a chuck hole and spun us around and around, grinding us to a halt with the engine still running.

My briefly made acquaintance disappeared in a flash—leaving only a cloud of dust down the road.

I collected my gear, parachute, helmet, crank, etc., which was spread all over the field and was airborne headed for Augusta, Kan., still low on gas and exhausted. The right tank lasted one and a half minutes after hitting the empty mark and the engine quit cold. I wobbled the pump, switched tanks and lost 100 feet. Now at 1,100 feet, Augusta was dead ahead. At this point every open field looked like an airport, but not the right one. The left tank emptied and there was silence once again. I started to turn to my left when from under my wing popped up three aircraft parked on the line at the Augusta Municipal Airport. I completed a 45-degree turn to the left, barely cleared a small cow fence and pulled up short with about a ten-foot roll. A tow to the gas pit resulted in 44.8 gallons pumped into 45 gallon tanks.

ROBERT ZEH

Irvington, N. Y.

DON'T CHANGE HORSES. . . .

IT WAS a beautiful April day, just right to hop across the Georgia countryside.

Jim, in the back seat of the L-16B, our CAP plane, shouted above the noise of the little aircraft: "Hey, let's see if there're any fish in Pippin's Pond."

I dropped the Champ down to about 500 feet, but we could not spot quick finny shadows beneath the pond's surface.

Pulling up two-three hundred feet, I yelled, "Jim, take her. I wanna check the heading to Camilla."

Jim replied, "Wait'll I put the stick back in."

We had noticed during pre-flight that the rear stick was not in place. One of the squadron members had made a blood lift from Savannah to our local hospital a couple of days before, and had got in so late that he'd rushed off without replacing the stick. So Jim reached for the stick, and gave it a smart shove into the socket.

Only he got it in backwards. The stick is offset so that the knees won't hit it in aileron control. There's a round red ball on the top end.

Somehow, while Jim was trying to outmaneuver the reverse curve on the thing, the ball slipped up under the metal strap that supports the front seat cushion and jammed there. We had the aileron-lock in full nose-down position.

It took a few seconds of spirited interchange for each of us to discover that the other was not, for some inconceivable reason, frozen on the controls. Meanwhile, my subconscious took over. Without any particular step-by-step reasoning, I gave the little airplane full power and trim in an effort to get her nose up, which it did. She went up into a sort of half-loop, then began to spiral in and made about 1½ turns while I was frantically working on the immovable stick and riding the rudders.

The ground was coming up fast so I gave one last desperate kick on right rudder. We hit on the right wing and gear, crabbing along for about 60 feet before coming to rest in a shocking silence.

We had landed in a huge, obstacle-free, treeless pasture. The plane had hit with a terrific impact, causing me to make an unscheduled indentation in the instrument panel. The edge of the panel dug a small channel across my forehead, but that was all.

Although Jim howled that his back was broken, he made good time getting out of the plane which, fortunately, did not catch fire. We extricated ourselves gingerly, gazing in horror at the wrecked body of the L-16. Eighty per cent loss was the decision handed down by the various investigating and inspecting agencies when they got through wringing us out, photographing, measuring and shaking their heads.

We are now pointed out as the guys

(Continued on page 86)

EXECUTIVE AIRCRAFT'S VIRGIL ODOM RECOMMENDS AC AIRCRAFT SPARK PLUGS!

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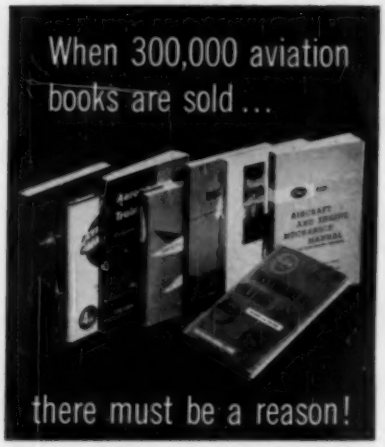

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HAVE YOU READ?

By JAMES F. SUNDERMAN

Air history can be likened to a spoked wheel. The hub—the hard core of knowledge—is comprised of the standard formal works of the scholar and historian. Outward from this nucleus, like spokes, extend the facets of history—bibliographies, memoirs, personal narratives, monographs, air fiction, etc.—elements which make for completeness of the wheel, give it shape and substance.

More often than not the formal history is general rather than definitive. It comes in a variety of formats, for example, the objective narrative as against the interpretative, conceptual, or picture history. Few inspire for "reading pleasure," but all are indispensable to a body of literature.

A HISTORY OF THE UNITED STATES AIR FORCE, 1907-1957, edited by Dr. Alfred Goldberg (D. Van Nostrand, $6.75).

This book looms foremost among recent general air histories. Written by professional air historians, the book spans half a century, from the creation of the Aeronautical Division, U. S. Army Signal Corps (1 August 1907), to the present. Organizationally it divides into three major periods. The Balloon to the B-17 recounts the early days, the first great war, and the period between the wars; Poland to V-J Day composes the next 20 per cent and deals with the air war world-wide, theater by theater, and at home. The bulk, concentrating on the last decade, unfolds the story of the independent Air Force through a pattern of "The Men," "The Tools," "The Mission" and "The Deeds."

Researched from AF archives, the volume is profusely illustrated and contains a comprehensive index and bibliography of source materials which any student of history will find valuable.

CEILING UNLIMITED: THE STORY OF AMERICAN AVIATION FROM KITTY HAWK TO SUPERSONICS, by Lloyd Morris and Kendall Smith (Macmillan, $6.50).

This is a general popular air history. Its illustrated narrative interweaves the story of military and civilian flight. Differing from the standard approach by emphasizing the human values in flight and the personal aspects of aeronautical development, it has far more in store for the non-specialist than does the orthodox history. A detailed index aids in quick reference and research.

More than most great fields of endeavor, aviation is photogenic. Its high glamor and drama can be captured pictorially. During the late '30s and '40s, combination picture-narratives played hard on aviation's photogenic qualities. Among the now out-of-print titles are S. Paul Johnson's two, *Horizon's Unlimited: A Graphic History of Aviation* (Duell, Sloan and Pearce, 1941, $3.95), and *Flying Squadrons: A Graphic History of the U. S. Army Air Forces*, (1942, $3.50). A classic still is the *Official Picture History of the AAF* (Duell, Sloan and Pearce, 1947, $10). More recently, Lamont Buchanan's *The Flying Years* (Putnam, 1953, $5) brings the record of American Aviation into the '50s while all photo-histories are far outclassed in weight, size and photo-coverage found in *Flying: A Pictorial History of Aviation*. (Year, Inc. 1953—with a new up-to-date edition due out by the end of December 1957).

More in the class of reference, yet still history, is *Aircraft of the Royal Air Force, 1918-1957* by Owen Thetford (Putnam, London, $12.50). This encyclopedia of all RAF aircraft types from 1 April 1918 to present, plus a few of the record-breaking and R&D models, is a thorough rundown on British military aircraft. The book is organized by company makes, both British and American, and each model series is shown in photo and three-view line drawing, with a narrative giving development and operational history, numbers built, design, production and flight specifications, armament, combat record and squadron assignments.

LIFELINE IN THE SKY: THE STORY OF MATS, by Clayton Knight (William Morrow, $6).

Long-time aviation artist Clayton Knight has done well in capturing the worldwide epic of MATS in colorful, descriptive prose laced with black and white and water-color original art. Few indeed are the out-of-the-way MATS bases he missed probing the globe to research, write and paint this global air logistics force.

His book is essentially a world air-travelogue prefaced by a brief broad-brush of MATS' little known his-

(Continued on page 93)

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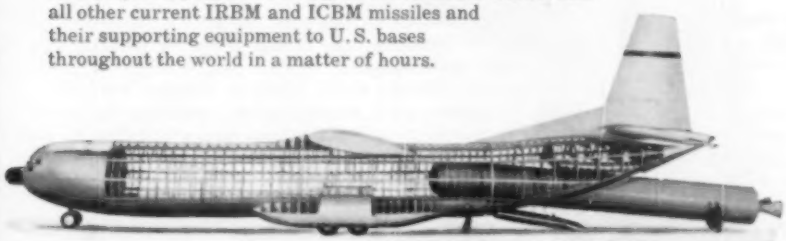
This huge turboprop air freighter can airlift 100,000 lbs. of payload more than 1,100 miles; it can transport 42,000 lbs. more than 4,000 miles non-stop. Its cargo ton-mile costs are as low as 5¢ on both short and long haul operations. It has the fastest loading and unloading time per ton of any modern airplane. Yet, despite its huge size and 350 mph+speed, it can operate from short runways.

Because of its ability to move the giant new missiles and their supporting equipment anywhere in the world in hours, the C-133A makes it possible to achieve a major increase in the effectiveness of our overseas bases while decreasing their size. It will buy more protection per dollar for the American taxpayer.

*It more than pays for itself! The turbo-prop C-133A operates at a much lower cost per ton-mile and with far less flight and maintenance personnel per ton-mile than any other air freighter now in service. It is estimated that it will more than pay for itself in reduced operating costs alone in less than 2 years.

Cavernous cargo hold of the Douglas C-133A is capable of transporting the Air Force production IRBM THOR and all other current IRBM and ICBM missiles and their supporting equipment to U.S. bases throughout the world in a matter of hours.



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The People, the People . . .

GILL ROBB WILSON
Editor and Publisher

I WAS raised in the teaching that the Republic of the United States would be continuously great and good in direct proportion as responsibility for its character was assumed by its private citizens.

Abraham Lincoln put it a little differently than Grandfather and Father ". . . of the *people*, by the *people*, for the *people*," he said, with the emphasis where it belonged—but it added up to the same thing; that is, the *people* always in focus.

"Freedom," Father would instruct me, "is the right of the people to create and mold government, but they must not turn over their freedoms to government or to any other institutions. For example, freedom of the press is not the right of the publisher to print, but the right of the people to have knowledge. Freedom of religion is not the right of the Church, but the right of the people to worship.

"And liberty," he would explain, "is the atmosphere of freedom men breathe within government and which government breathes within civilization. Everything begins and ends with the people under God, so unless the people assume responsibility toward government, it may become their master.

"And that," he would rap his knuckles on my chest and say, "could happen to you."

One day he took me to Washington and we went to the White House to call on the President, Mr. McKinley. They led me to where Mr. Lincoln's desk chair was preserved with a red plush rope to keep it against injury and wear. We went over the rope and Mr. McKinley invited me to sit in the chair. I wriggled away in a frenzy of embarrassment. I felt it would be a desecration for a boy to sit even for an instant in the place of the Great Emancipator—he who so loved the people that he could not bear for any to lack freedom.

But what in the world does this have to do with aviation? It has everything, as I see it.

The coming of the air age introduced the most profound chain reaction that human destiny has known since Christ. But the institutions of our land—political, educational, religious, economic, social—refused to ponder this matter or contemplate its potential. The people therefore have not been indoctrinated. Not really knowing, they could not really care.

So now they find themselves out-run in pertinent respects by a people which lack even the ingredient of freedom, and by a government whose cynicism concerning the dignity of the private citizen is unsurpassed in all time. This our people can not understand. What happened?

I can tell you what happened and so can every other veteran airman. It wasn't lack of dollars. It wasn't any overwhelming foreign genius. It wasn't failure of the airplane to produce boundless utilities. It wasn't lack of forecast by airmen on the significance of the air environment. It was sheer lack of preparation of the people to be at home in the air environment. The citizen has been left out of focus with the air age. He has had no foundation in concept from which to ride herd on national policy. Our institutions didn't prepare him to exercise intelligent responsibility toward his destiny.

This crime of omission must lie where it belongs, at the feet of religionists who cry "Peace, Peace," when there is no peace except through the moral discipline of airpower; at the door of public education more interested in defending prerogatives than the country; at the feet of politics whose modern party platforms, barren of concept on where lies the fate of the people, starkly rank as among the most undistinguished documents of history; at the door of the public press in all its media, broad sections of which contributed nothing to the interpretation of the decisive air environment.

And what do we see as the proffered solution to our downgrading by an avowed enemy? A statesmanlike effort to get at the source of our situation? But no. Rather a multiplication of czars, a numerical increasing of boards and committees and, to cap the climax, a ponderous expression of belief by a national voice that the people will bear even heavier taxes if necessary! That news is several thousand years old. "What will a man give in exchange for his life?" The American people scarcely need be reminded of it at this point.

In the long roll of time, I envision that the dilemma now faced by the American people and their government can be made to serve a great and good purpose. But it must be faced that the aviation scene is a mirror to its underlying causes. There is no solution to our air environment situation as remote from the basic irresponsibility which authored it.

It is meaningless, [illegible], even hypocritical, for one political party to blame another; for the Congress to blame the White House; for the military services to exercise censure among themselves; for the Bureau of the Budget to pass the buck to the Defense Department. True, some have loved the leeks and garlic more than others, but it's merely a matter of degree.

Fundamentally, the voice of the people must rise again in the land—fearless, reasoning, questioning. Nothing great and good can happen until the people are in focus. They will pay for freedom, fight for freedom, die for freedom when they understand.

We are in our dilemma today because aviation, its industry, its commerce, its potential for international discipline, came to maturity without a conscious grounding in the public mind. That this could happen is a danger sign. It hints that government and our several institutions have become something other than the dedicated servants of the people.

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AA

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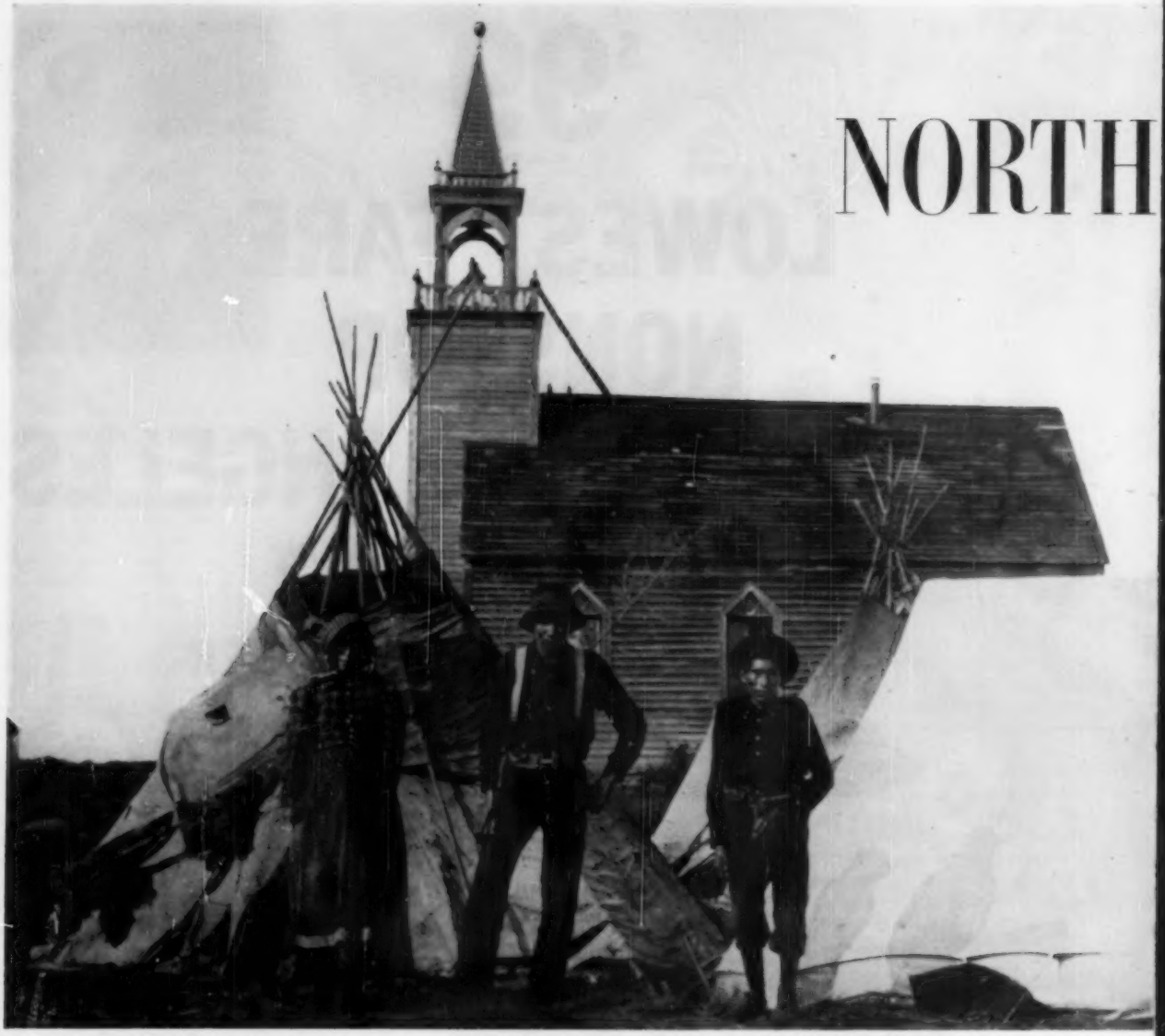
NORTH



Down through the years, there has been little change in the way of life for the inhabitants of the far north.

I'M NOT GOING to tell you where I went. I'll recite why I went there, how I got there, and what I found there. But not where it is. Not that you would mess up my wilderness hideout. You wouldn't. But all your friends would.

If this sounds selfish—I am. Because I struck gold this trip, of a kind the tax collector can't touch, and I'm not going to share this particular claim. But maybe I can help you find one of your own.

I can't afford extended vacations. When I have the money I haven't the time, and conversely. Whenever I take off, it's to cover a news event somewhere. It's usually difficult, sometimes depressing, never fun. Always I have to take along a typewriter and a microphone. I'd rather go fishing. I longed to go, one time, where the mike cord couldn't reach. I wanted to find fish which had never seen a man, and let them see me.

It was a hot Thursday afternoon that I topped the Apache's main and auxiliary tanks at Meigs Field on Chicago's lakefront. (You'll want to remember those auxiliary tanks if you try to follow.) I climbed in, tossed my homburg on the back seat, and pointed away on a compass heading of zero. And I kept flying north. Milwaukee Weather forewarned me of a thunderstorm over Green Bay, Wis., which I detoured. Otherwise—straight north. When I ran out of omni stations, I still kept going north.

Seven thousand feet over Lake Superior, it was cooler. The 56-58 degrees outside temperature can readily become half that in the carburetor. Especially with the addition of a few degrees of over-water imagination. Actually, I'm convinced those 150 Lycomings tell me when they're uncomfortable long before the gauges show it. Anyway, I had carburetor heat on and off all the way across. I landed

---

Mr. Harvey's flying dates to a rebuilt Monocoupe in 1933. But his greater claim to fame is as a newspaper columnist and radio broadcaster in Chicago on the American Broadcasting Co. network. He frequently flies his plane between assignments and speaking engagements.

H and NORTH and NORTH

Primitive frontiers are but half a day from home for a city dweller who flies his own light twin.

By PAUL HARVEY

The author, noted newscaster and newspaper columnist, about to take off in his Piper Apache.

Typical Ojibway Indian family of the far north.

at Port Arthur, Ontario, Canada, cleared Customs, topped the main tanks and the auxiliaries.

A word about clearing Customs. There are three things to remember. As with any flight plan, tell them you're going and tell them when you get there. But with Canadian Customs, also tell them you're coming. For example, from Houghton, Mich., where I announced my flight plan into Canada, I asked that Customs be informed of my ETA. This way the Canadian Customs Agent, with 50 minutes' notice, was at the Port Arthur airport, waiting. The rest was an easy five minutes. In other words, there is a minimum of red tape. If your aircraft is searched at all, it will be brief and cursory. Unless there's something to hide. Customs men have a sixth sense about such things.

For a short while, north out of Port Arthur, there were signs of life around the many lakes below. Then these disappeared. I saw one dirt road running parallel to my northbound course. Then that last road turned around and went back. I kept going. In the twin, you fly over water and rough country that you'd hesitate about in a single engine landplane. I kept going north.

Armstrong Station is a radar outpost, part of the Pine Tree Line, our first DEW line. As in any ADIZ area in the States, they'll keep an eye on you, though they are not concerned with northbound traffic. Established in cooperation with the Canadian government, these stations exist primarily for spotting invading planes coming at us over the North Pole. But they are also available as radio contact points for civil air traffic. I radioed Armstrong Station. Used code "Sippert Control" on 121.5. It was reassuring to hear a very British voice reporting the latest weather. I won't identify my heading out of Armstrong Station. It was no longer due north.

Though I understand Canadian sectional charts similar to our own are available, from here on I was flying dead-reckoning and checking by a map which had been the property of a now-extinct mining company. The map showed a 3,000-foot "clearing" (*Continued on page* 68)

CROSSING THE ANDES

IN A 170

A family foursome matches

a 145-hp engine and small plane against

the length of a hemisphere and

the height of the Andes, and wins.

The Wells Family is the pilot, three-year-old Susan, six-month old Bobby and co-pilot Meryl, who learned to fly in Buenos Aires.

By ROBERT E. WELLS

HONEY, TURN AROUND so I can see it," insisted my wife Meryl. "I'll be darned if I'll let you bring me this far and not be able to say I've seen that statue."

So I banked the plane to the left and scraped the frost from the window. "Look down the wing. I'm pointing the tip right at the base of the statue."

"Oh!" she exclaimed, "now I see it. But I thought the 'Christ of the Andes' would be much bigger."

"Well," I reminded her, "it's 3,000 feet below, so it should look small."

The inside of the window had frosted over, due to the extreme cold at altitude, so I scraped it off again while Meryl held six-month-old Bobby up to see and at the same time we let Susan, our three-year-old, look out over my shoulder. "They might not know what they are looking at," continued my wife, "but some day they can say they saw it."

Being able to look down out of our own little four-place plane on the famous pass over the high Andes, where the peaceful border between Chile and Argentina is marked by the renowned Christ of the Andes, was a satisfying climax to our family adventure. We had left the States in our Cessna 170, destination Buenos Aires, Argentina, and come down the west coast of South America to Santiago, Chile, before attempting to cross the continent and the Andes.

It took 11 days elapsed time from our home in Las Vegas, Nev., to Santiago. Two days had been spent sightseeing at Lima, Peru, and another half day had been happily wasted at Acapulco. Our flying day consisted of getting off the ground as soon after sunrise as possible. We averaged four hours of flying before stopping for gas and lunch. Then back into the blue for another four hours. That way we landed at each day's destination with enough daylight to do some sightseeing before putting our tribe to bed for the night.

As we anticipated, the trip was very comparable to a two-week motor trip with a couple of small children. We made regular stops, trying to hit the biggest cities with the best hotels. A couple of times we were obliged to land at out-of-the-way places but that only added to the pleasure. In El Salvador, a ranch provided us with a splendid guest house for the night. At Turbo, Colombia, we were told of a small hotel about a mile down a jungle trail. The only disconcerting factor was the nonchalant advice not to leave the hotel until after sunrise. Poisonous snakes used the road during the night and didn't like to be stepped on!

The trip was a splendid education, the panorama ever-changing and always beautiful. Even crossing the steaming jungles of Panama, Colombia, and Ecuador, or the arid deserts of Peru and Chile, we could provide our own air conditioning by flying at a cool altitude so that our point of view was always comfortable. We weren't finicky about what we ate but for the children we had brought along canned baby foods, powdered milk, and dehydrated soups so that their diet was a constant one. We limited ourselves to drinking only bottled water or soft drinks but ate anything presented. For the baby, we had a bottle-warmer plugged into the cigarette lighter and provided him with hot milk.

The only disconcerting element on the way down was the question by everyone, "But how will you cross the Andes?" Some who had flown it in commercial planes told hair-raising tales. Pilots who had been across in big planes looked askance at our flivver and shook their heads. In Panama, one old pilot mentioned the terrific turbulence in the pass and compared it with that found in crossing the "hump" between India and China. At Ali, Colombia, the question of oxygen was raised and so were eyebrows when we said we had none! Farther along at Lima the general consensus was that our plane wouldn't even go that high! As we cruised farther south, our hesitation grew regarding the crossing we had planned, and continually projected our (*Continued on page* 54)

Mr. Wells is a former Naval Aviator who terms himself a "conservative" banker employed in Montevideo by The First National City Bank of New York. He describes his trip as not unusual. "We are not adventurers, nor tourists. Our only claim to novelty is taking our two children along."

Thirty-three active island stockholders share the worries and triumphs of Island Sky Ferries as it serves up

A BETTER WAY

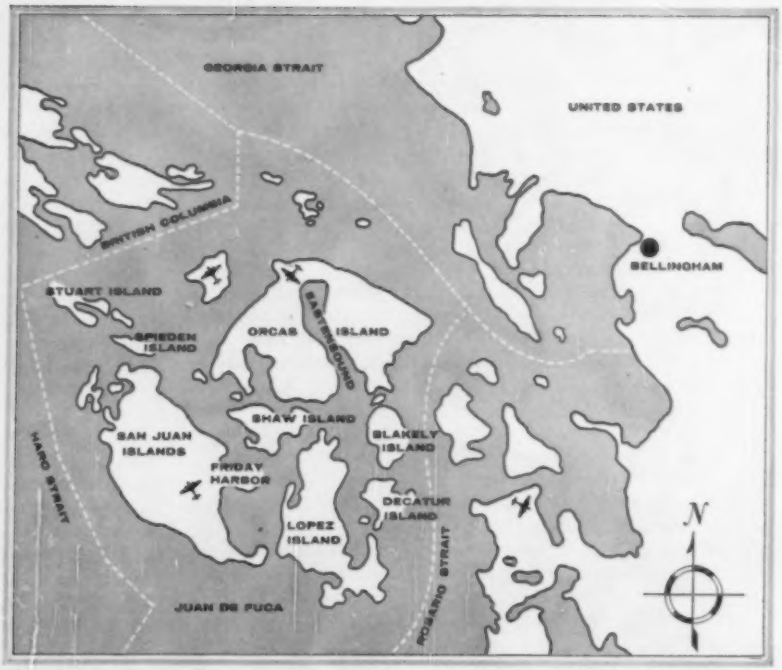
By D. CONNELLY

Roy Franklin, owner-manager-pilot of Island Sky Ferries, and Stinson Bushman.

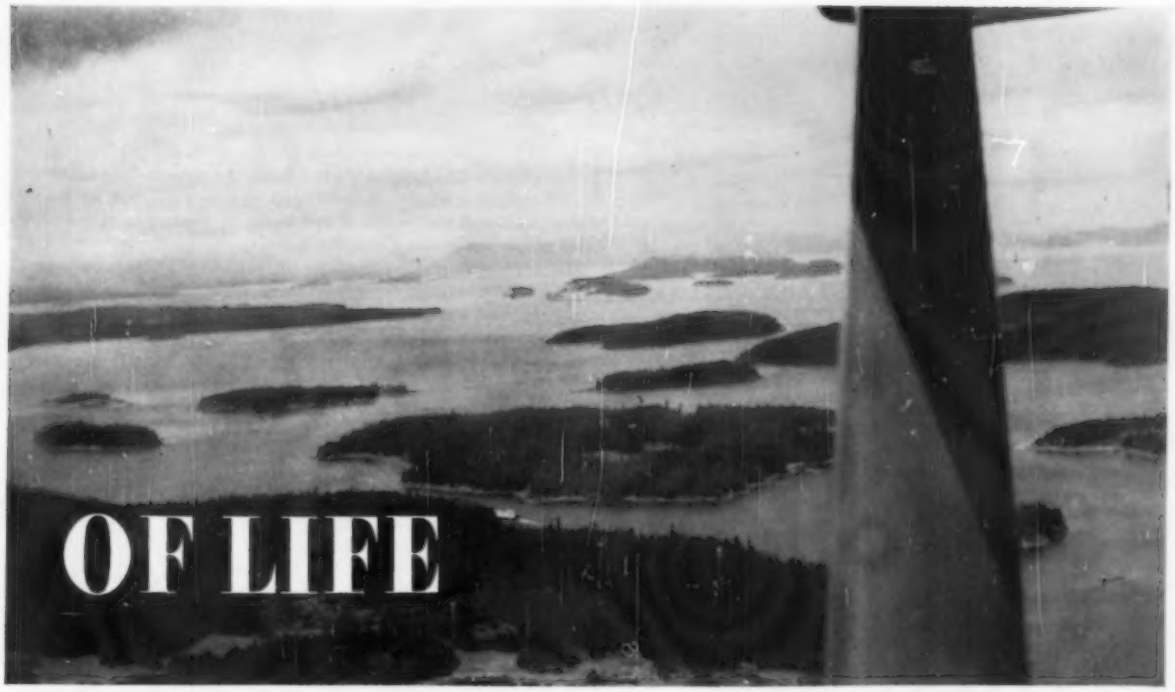
Passenger Lewis E. Dodd (left) discusses flight with Pilot Vaniman at Bellingham.

Time was a Sea Bee flew the Ferries route. Another old-timer is the lumber schooner.

Hard sands on the beaches are used during deep tides, as shown at Waldron Isle.



Island Sky Ferries operates among the islands of San Juan County, Washington, combining the qualities of an aerial Toonerville Trolley, a guardian angel and a competent scheduled airline.



OF LIFE

WE SAN JUAN ISLANDERS look to the heavens for succor in more ways than one. We watch and listen when we need help, knowing that Roy Franklin will sight our distress signals and wing his way to us, despite any obstacles. Roy is the reason we can live in this paradise of isolation, safe and secure. He watches over our scattered permanent winter population of 3,235 (treble that number at the top of the summer). You wonder why we islanders think so much of the man? That's it."

Irving French, retired Bellingham, Wash., high school teacher now farming on Waldron Island, was explaining the warm bond between the owner-manager-pilot of Island Sky Ferries and the people of the archipelago.

Combining the qualities of an aerial Toonerville Trolley, a guardian angel, and a competent scheduled airline, Island Sky Ferries is probably unique in the entire United States. It may save an islander's life in the morning and pick up a new girdle, size 36, in the afternoon; fly a child for her piano lesson and return with five pups; beat the stork by six minutes and, an hour later, deposit a road crew at its work site. Franklin, 33, and his young fellow-pilot, Herb Vaniman, 28, know no boredom on their multi-island-mainland routes.

Routine air service joining mainland points and various islands was begun in 1945 as "Island Airways," its founder a former Navy captain, Walt Paull. Thereafter, the business changed ownership and name every year or so as various proprietors lost money or enthusiasm, or both. Roy Franklin, a Navy fighter pilot of World War II, joined the company early in its history. By 1953, he had saved enough money to purchase a controlling interest in the company, which had been incorporated as Island Sky Ferries by Schoen of Seattle and Orcas Island in March 1947. The line does not have a mail contract, but makes its way from passengers and freight.

Thirty-three island stockholders actively share the worries and triumphs of the little airline whose equipment consists of three four-place Stinson Voyagers and a Stinson Bushman which carries seven passengers and may be quickly converted to an ambulance.

Despite its wobbly business past, Island Sky Ferries' safety record is spotless. In more than three million flight miles, carrying an annual 4-5,000 customers, no person or plane ever has been scratched. And Roy, in his five years of operation, has grown so indispensable to island living that he has been off the job just once—to take his wife, Margaret Ann, and their five small children to Spokane.

The line rarely misses as many as a half-dozen flights annually on its schedules from Friday Harbor throughout the islands to Bellingham and return. It maintains operation in everything but the worst howling northeasters. This facing up to practically all weather is based on a unique condition. The pilots can sit down in so many places. No plane aloft is ever more than eight air miles from a landing field. Airstrips are available at Eastsound, Orcas Island, Friday Harbor, San Juan Island, Waldron (where two strips are augmented by the beaches at low tide), Stuart, Spieden, Blakely and Shaw Islands. The first two are scheduled stops, others are on signal.

When Waldron Islanders need Roy, they stretch a white canvas between poles on the school grounds. Elizabeth and Lewis Dodd, lone residents of Yellow Island, run up a yellow ball on a pole at the corner of their log cabin. Urgent need for aid may be any ingenious device the victim can contrive.

Bob Schoen, flying on regular schedule, once noticed smoke rising from a high cliff on top of tiny Clark Island in the channel between Orcas Island's north shore and the west coast of Lummi. Alert to the unusual—night was coming on and no beach picnic ever took place at that height—he searched Clark Island's shoreline for a telltale motorboat. When he spotted none, he flew low over the smoke to make out a woman and two small children pointing frantically across the waters. Next he flew in wide, low circles over the dark (*Continued on page 74*)

LET'S ELIMINATE A STATISTICAL STIGMA

"PILOT ERROR"

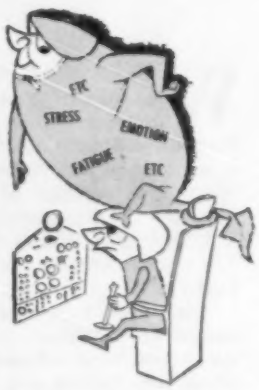
A very handy term for covering causes of undetermined aircraft accidents is long overdue for an overhaul.

By JEFF SUTTON

PILOT ERROR is a careless phrase with an implication which should be eliminated from the aviator's lexicon. It is this writer's opinion that too many accident investigators and statisticians are burying a lot of things besides pilots when they use the term.

The term generally concerns unfortunate souls who are not presently around to defend themselves. It is used carelessly in accident reports, statistical tables, newspapers, trade journals, and even in hangar-type conversation. As a group, there is none less forgiving than pilots whenever misfortune befalls a brother aviator. Strong words, you say? Well stick around and maybe we can do some convincing.

Recently, two young pilots met disaster in a lightplane accident. They were from a field where this writer does some flying. There were no witnesses to the crash. Bare minutes after it became known, the "Board of Aviation Types" at my field had met, discussed and fixed the blame. Their indictment? Pilot error. The pilot, they said, was an ex-Air Force hotrock who thought he was pushing some high-powered equipment around. They decided a stall in a tight turn at low altitude was the direct cause of the accident. Fortunately, an alert mechanic stumbled onto the real reason. The front drag strut fitting had failed and led to a major structural failure which, in turn, had resulted in the "hotrock's" accident.



"Pilots occasionally react to..."

A transoceanic airliner landed at Shannon Airfield in Eire and taxied toward the unloading zone. The pilot ordered "flaps-up." The co-pilot pulled the gear control handle to "wheels-up" position. The airliner dropped to the runway and was badly damaged.

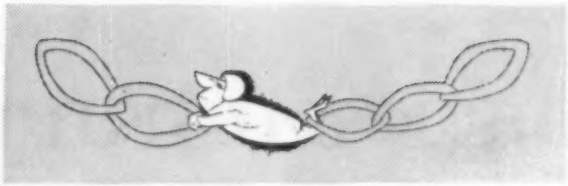
An executive pilot made a normal night take-off and retracted landing gear as airspeed increased to 160 mph and altitude to 300 feet. The pilot read the gyro-horizon indicator as showing a slight nose-up attitude. A few seconds later the plane hit the ground in a level attitude, with an impact which caused later investigative reverberations.

The pilot of a McDonnell F3H2 Demon entered an overcast at 7,200 feet and switched to the gauges. He subsequently reported losing sense of direction, balance, and the onset of vertigo. He ejected while in straight and level flight attitude.

Pilot error you say?

Well, anyway, that's the way the records read. In short, these pilots actually "goofed." They weren't on the ball. They and scores of others. And to prove the contention, we have elaborate statistical tables to show that goofing or, more politely, pilot error, is the major single

A former newspaperman and public relations practitioner, Mr. Sutton is a Research Engineer with the Human Engineering Group, Convair-San Diego. After Marine service, his interest in planes, people and psychology prompted him to an MS degree in experimental psychology.



"The pilot is only a link in the causal chain . . ."

cause of aircraft accidents.

Crash investigation teams have developed to a science the process of fitting together thousands of pieces of scattered aircraft, and in producing determinations of cause. However, despite their skills, a sizable portion of crash investigations go into the books as "undetermined." The pilot error statistics always tops the overall probability. It can be a very handy term. It allows us to pinpoint responsibility for an accident. It satisfies our passion for cataloguing results in neat, complete statistical tables. Better yet, it allows us to "close the books." But—and here's the *big* but—it tells us very little about the accident itself.

That's why it's time for an overhaul. We should give pilot error a jaundiced look or, better yet, consign it to what the Navy boys call the "deep six."

In the first place, pilot error can't be the prime cause of any accident. What caused the pilot to err can be. That's what we've got to look at—the causal chain. The factors which sponsor accidents. Cause is rarely a single item. The aircraft accident is the product of a sequence of influences which combine to form the disaster pattern. These influences include design features which invite error; routines which place the pilot in an accident-prone environment; and human factors which affect performance but over which the pilot has little or no control. Worse yet, all of these influences may combine in a way to make an accident inevitable. They probably often do.

Aside from the moral responsibility of protecting the pilot's good name, a more critical examination of causation influences would have direct force for correction. Admittedly, it is not always possible to examine wreckage and come up with valid answers as to why an accident occurred. By the same token, we shouldn't jump on the pilot error bandwagon merely because we succeed in linking a pilot's last actions with a subsequent disaster. In every case, we should examine contributing conditions and couple these with experience, experimental data, and logic insofar as possible. Then, perhaps, we would approach the "Why?"

We know, for example, that a pilot occasionally forgets, acts on mistaken perception, reacts to emotion, responds to "g" stress, operates a wrong control, misreads an instrument, or does any number of things which invite trouble. All these phenomena constitute pilot error, but most of them will be found related to the design—environment—human factors. As such, they demonstrate the pilot to be but a link in the causal, and not the chain itself. They demonstrate, too, that the human is an inherently variable machine, that man at his best has dire limitations and that human physiology falls short of the demands of machine technology. We cannot expect the pilot to be superman, and hang him if he falls short.

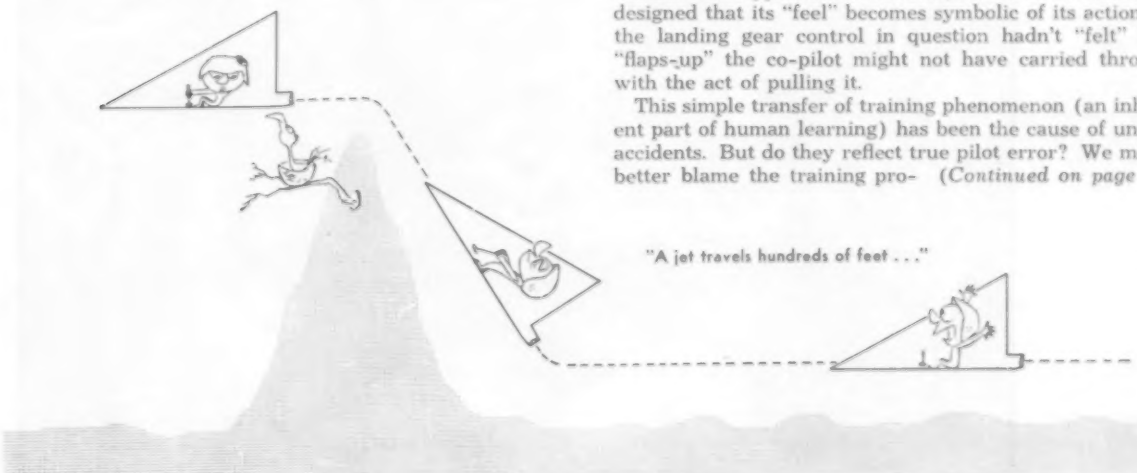
"Let's take a look at the co-pilot who goofed by pulling the "wheels-up" control at the pilot's "flaps-up" command. Investigation disclosed that this co-pilot had been trained on another type transport in which the flaps lever was in the same position as the landing gear control of the damaged aircraft. He had reflexly reacted to the stimulus of the command, "flaps-up," as he had initially been trained to do—a good example of the transfer of training.

Beyond this momentary "goof" lie some salient lessons in training and design. The major purpose of training is to develop stable habits of response. A habit is an action which, by its very nature, is removed from the conscious mind. It is a reflex response, mediated below the brain, hence is inflexible. Training consists largely in acquiring the ability to operate machines reflexly. Such learned patterns persist, despite later learning. Extreme re-training is necessary to extinguish them to a "safe" level. They are initiated by a given stimulus before complete awareness of the stimulus itself. For example, we hit the brakes of our car before we fully appreciate the emergency. Experiments show that in moments of stress, or when the mind is otherwise engaged, the pilot may react to earlier training. This pilot did!

A pilot should be kept with the same model aircraft as much as possible. Intensive re-training periods should precede change from one aircraft to another and this should be followed by frequent "blindfold cockpit tests" to fortify the new learning.

On the design side, primary controls should be standardized as much as possible. Controls should differ in location and appearance. Further, a control should be so designed that its "feel" becomes symbolic of its action. If the landing gear control in question hadn't "felt" like "flaps-up" the co-pilot might not have carried through with the act of pulling it.

This simple transfer of training phenomenon (an inherent part of human learning) has been the cause of untold accidents. But do they reflect true pilot error? We might better blame the training pro- (*Continued on page* 80)

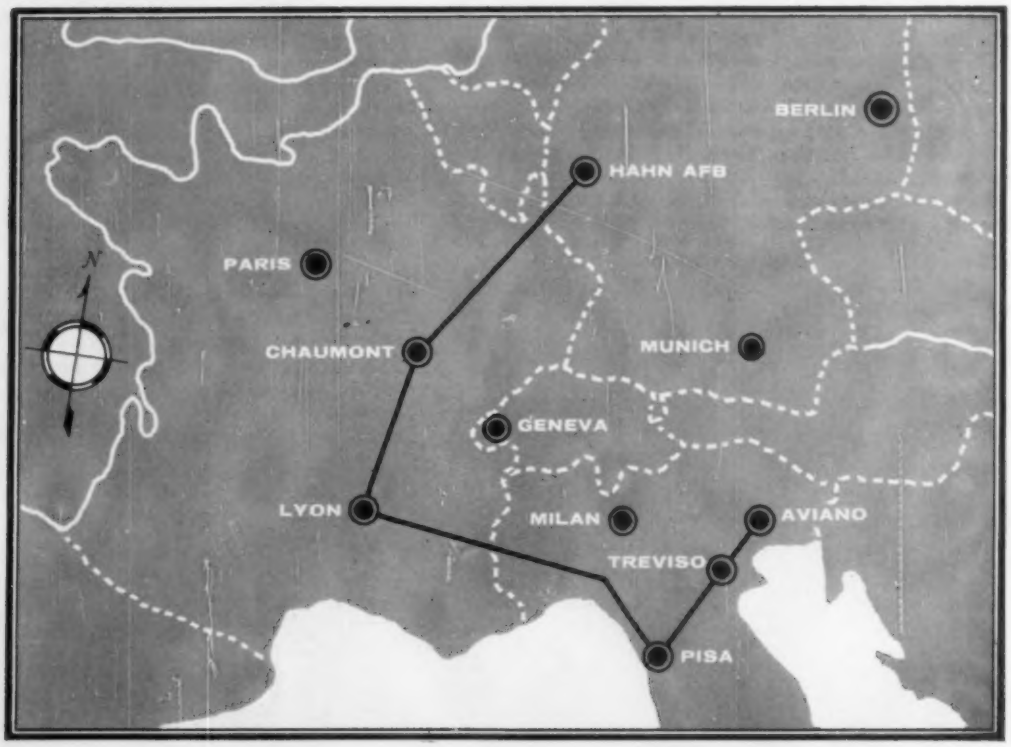


"A jet travels hundreds of feet . . ."

POST MORTEM IS

By
ROBERT S. HIRSCH, CAPT., USAF

A pair of errors brought on a nearly fatal descent at night through 39,000 feet of weather to a strange field and unguided, unlighted deadstick landing.



A GOOD TEACHER

ACCIDENT ANALYSIS has undoubtedly produced much of value to the pilot. I think, however, more could be produced by analysis of experience that did not culminate in accident, if we but took the trouble to set down the various factors that entered into consideration. In addition to pre-flight planning, post-flight study of what had been good or bad about the judgment exercised would undoubtedly polish up the knowledgeability of the airplane driver.

The following sequences of a flight from my own logbook will illustrate the point I make. For example, for what seemed a very solid reason at one point, I turned off the radio and missed a warning which could have been vital. That the warning was not needed was sheer luck. At another point, I made a choice between two alternate causes of malfunction, and it proved a wrong choice. On the other hand, I later compensated for the possibility of my wrong choice and found myself with power when I badly needed it.

While this study was a sequence in jet operation, its value is not unique to jet pilots. Similar sets of circumstances happen every day in every category of aircraft.

But now to get to the story. In substance, I let down at night through 39,000 feet of weather to a strange airport with a 200-foot ceiling, without the aid of precision landing aids, and deadsticked a landing. A lot of different considerations went into it.

The beginning of this sequence of events was on the morning of the 18th of January 1956. I was scheduled to fly a fellow pilot from Hahn Air Force Base, Germany, to Pisa, Italy. Take-off was scheduled for 0900. Normal flight planning was accomplished and the weather checked.

Airfields publish NOTAMS which all Airbase Operations carry on file for pilots scheduled to clear into any strange base. They inform a pilot of any peculiarities of his field of destination.

Pisa lay right on the border of two control zones, Rome and Milan. I read the Rome NOTAMS and, under Pisa, found no unusual situation. I did not read the Milan file where a NOTAM stated that the Pisa runway was under construction and flying from the field was done on the taxiway that paralleled the runway. This situation restricted night landings since the taxiway had no border lights. In any case, my take-off schedule was for 0900. I would land at Pisa long before dark. Field lighting was no problem—or so I would have thought even had I read the Milan NOTAM on Pisa.

Since the weather at Hahn was zero ceiling and one-quarter mile visibility, I made a close check on general conditions. There was no alternate field that met minimums within 150 miles of Hahn. If we had trouble after take-off, we would be forced to attempt zero-zero landing with a crippled aircraft. Also there was a freezing level from 5,000 to 7,000 feet. I elected to wait out a more favorable pattern, although weather at Pisa was better and not expected to drop below minimums during the day. Being a little late would not affect the mission.

The wait was five hours!

Much ribbing from fellow pilots ensued such as, "What ya got son, a Blue Card?" When ceiling at Hahn lifted to 100 feet and other fields were reporting a general lifting, I filed my flight plan and departed. We were now briefed to expect moderate icing from 7,000 to 10,000 feet and thin layers beyond before reaching altitude. There was general warming of air up to 5,000 feet, so ice would not be a problem at take-off and acceleration levels. After that, one could climb in a jet through the ice levels without too much concern. The weather briefing, however, proved slightly inaccurate.

Rain and snow began to fall at take-off. This was my first warning of possible danger but the Adiabatic Chart had shown warmer air aloft. I had no valid reason to fear heavy icing. We climbed straight out on instruments and started encountering ice at 5,000. It was a steady build-up. The aircraft began to lose performance. At 18,000 feet, we were on top in the clear but packing a lot of ice.

I felt that our chances of losing the ice would be better down toward Pisa. A penetration toward Germany and Central France would only mean more ice. We already had lost 25 knots from our indicated speed at 25,000 feet. I decided to go on to Pisa but cruise control had to be used to its maximum. The winds became stronger aloft and were from about 270 degrees. Since my first leg was about 235 degrees, I used high-power cruise settings and remained at 20,000 feet. As we reached the Chaumont area and turned more south to 180 degrees, we climbed laboriously on up to 30,000 feet and I reduced power to just under normal cruise.

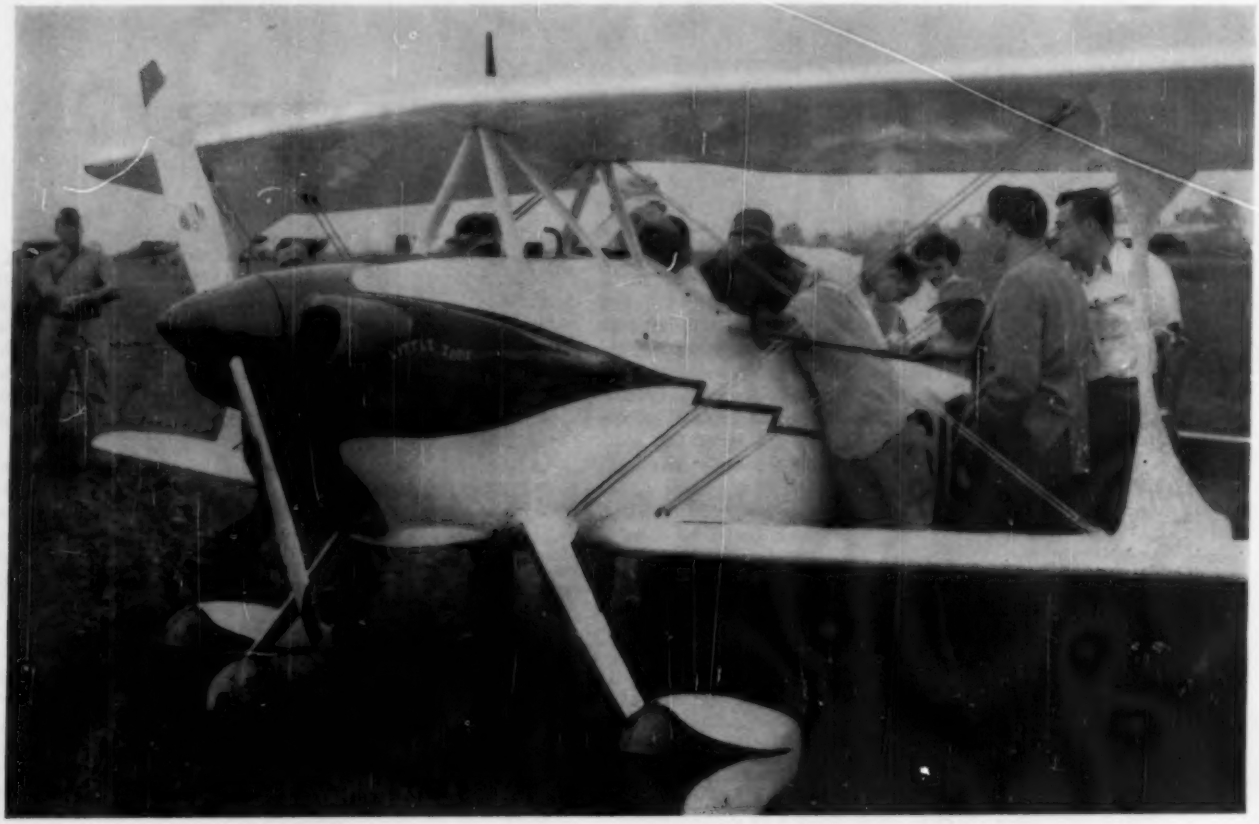
Over Lyon we turned east, lost a bit of ice by evaporation and were able to reach 35,000. Our indicated speed now was down to 190 knots against a normal 240. But now we had higher and almost direct tailwinds, so I reduced power and slowed up 20 knots more. As we approached northwest Italy over the Alps, the weather piled up so we climbed slowly with a partial power increase. We had not lost any more ice and altitude was difficult without sacrificing airspeed. A little more power was needed but, with increased altitude, the fuel consumption did not increase proportionally. We had no great need to squeeze every ounce from the aircraft but something about the situation prompted me. I estimated we would reach Pisa with much more than enough fuel, yet for reasons I don't know, I was conserving it.

We approached Pisa at 39,500 and indicating 155 knots. The Pisa Airport Approach Control was contacted since we were still IFR at this level. A let-down to the initial approach altitude of 20,000 feet was requested. It was not yet dark and I had not thought of a night landing.

We were cleared to descend to 20,000 and given an approach approval. I was to call in when over the high cone. All traces of concern faded as we let down and I began to study again the approach procedure for Pisa. As we lined up for the outbound heading, the tiptanks emptied and I switched to main wing tanks.

When reaching 20,000, Pisa called and denied us permission to land. They said it was getting dark and night landings were forbidden. We must continue to Rome.

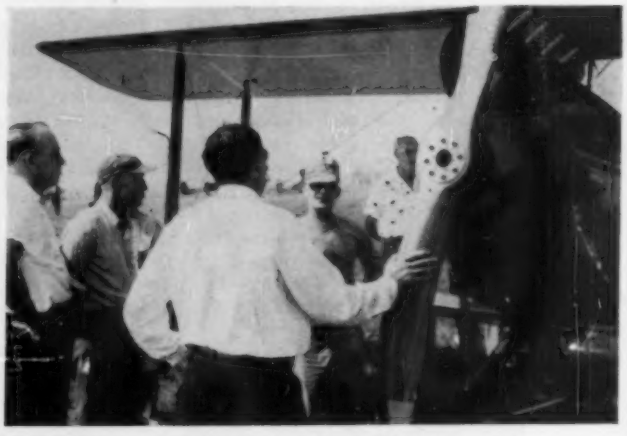
Oh, brother! where'd all this come from? It was not dark aloft. However, under 40,000 feet of weather, it may have been darker on the surface (*Continued on page* 56)



Nothing is overlooked by the gallery inspecting results of five years' work and $2,000 in "Little Toot," midget biplane of George Meyer.

MEET IN MILWAUKEE

Photos by BOB WHITTIER



Reminiscing over 1929 DeHavilland Moth restored to mint condition.

PEOPLE, thousands of 'em, met in Milwaukee last summer at Curtiss Wright Airport for the 1957 Fly-In of the Experimental Aircraft Association.

During the fifth annual three-day session, crowds of grown-ups and small-fry examined closely the ingenious products of the do-it-themselfers. The labors of aeronautic love included a score of homebuilt aircraft, nine vintage craft and more than 200 civil airplanes owned by some of the 3,000 EAA members in the United States and several foreign countries.

Nothing apparently escaped the visitors' attention. Details of construction were penetrated by the novice, as well as the veteran; the non-flyer, as well as the pilot. And, as always, the youngsters made the show by their awe-filled attention to everything that transpired.

To the backyard aeronauts, the meet in Milwaukee was the ultimate expression of the do-it-yourself craze since the homebuilt airplane represents countless hours of engineering study and long evenings of work with welding torch, steam box, ribstitching needle and spray gun. Far from being the crude results of hamfisted beginners, the planes are those of highly skilled technicians. END

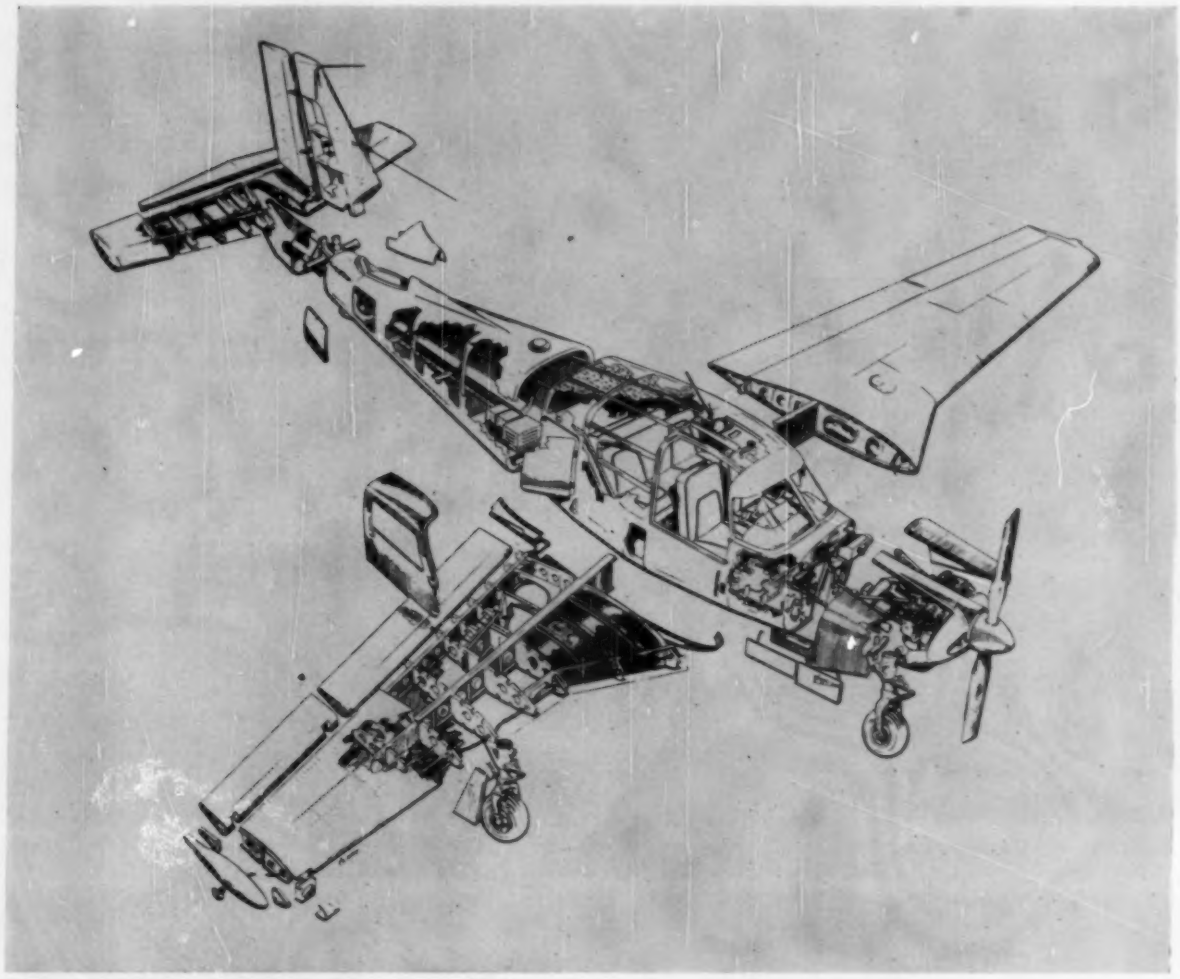
In the shade of a 1941 Piper Cruiser wing, examination is made of the Miller twin.

Small-fry found the old-time flying machine techniques used by builders to be fascinating.

"Wiley Post" 1935 sport-plane, with a Model A Ford automobile engine, attracts crowd.

Father boosts daughter on to wing of "Little Toot." Cockpit-leaning was good sport.

Trio of future flyers scans the "Baby Ace," open cockpit plane flown in from California.



Design details of the Piper Comanche are shown in this cutaway drawing. Some of its features are the stabilator or "flying tail," combining stabilizer and elevator functions; the laminar flow wing with deep main spar and swept wing root; and simplified controls.

FLYING CHECK PILOT REPORT ON THE

PIPER COMANCHE

By TED DUROSKO

WHEN I FIRST SAW the all-metal Piper Comanche (PA-24), I was immediately taken by its modern design. As it sat low on its tricycle gear, its laminar flow wing with swept-back roots, graceful fuselage lines, swept rudder and "flying tail," combined to give the impression of a high-performance, four-place business airplane, the first low wing produced by a major aircraft manufacturer in over ten years.

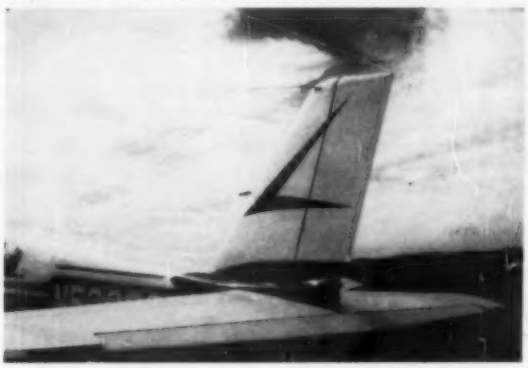
Its style and design gave rise to several major questions. Does its laminar flow wing give the Comanche any "trick" or "hot" flight characteristics? Is its "flying tail" supersensitive? How about longitudinal and directional stability? Can this airplane be handled by a businessman pilot with average experience?

For several minutes I pondered these questions as I examined Comanche N-5004D on the ramp at the Williamsport (Pa.) Airport where Piper's Chief Check Pilot, Howard Graves, landed to pick me up. Our plan included flying checks on the Comanche en route down the river to Lock Haven to see the plane on the production line. Apparently the question reflected on my face for Graves smiled and said: "Take her up and see how easy she is to fly." He pointed to the left-hand seat.

Eager to find first-hand the answers to the questions which had crossed my mind, I tossed my briefcase and topcoat onto the rear seat, climbed into the roomy, color-styled cabin, and adjusted the comfortable seat for my leg

Clean lines of the Comanche are evident from this view, looking down. Relatively small area of the stabilizer is obvious.

Comanche cabin is a roomy 45-inch width, with adjustable seats in front, six inches apart. Speaker is located aft of trim crank.



Swept rudder and stabilator is a new Piper feature. The single piece horizontal tail surface follows modern jet fighter design.

Instrument panel has room for full flight group. Left radio panel holds several units, with room for two more on right.

length. Then I looked around. The functional layout of the instrument panel and controls made it easy to orient myself. Flight instruments are grouped directly in front of the pilot; engine instruments are on the right and lower center. Throttle and prop controls are centered on the bottom edge of the panel, likewise the mixture control, carburetor heat control, and engine primer.

Directly below, in front of the nose wheel well, are located the flap control, hand brake, and telescoping lever to lower the gear manually in case of electrical failure. In this event, it takes a single movement of the lever aft to extend the gear.

The gear normally is actuated by an electric motor, with the control located on the instrument panel in full view of both pilot and co-pilot. It is a toggle switch type which indicates the position of the gear, augmented by light signals. This feature will be appreciated by pilots flying a retractable gear aircraft for the first time. To raise or lower the gear is a matter of flipping the switch to the position desired. In approximately seven seconds, a light informs the pilot that the gear has obeyed the command. A horn and red light warns if a pilot throttles back for a landing with gear retracted. On the ground, a switch located in the left main landing gear prevents inadvertent retraction.

My next immediate interest was the fuel system. Located conveniently between the two front seats is the fuel selective valve. It is a "feel" type, that is an "L"-shaped control which, when on left tank, points to the engine with one leg of the L while the other leg points to the left tank. When placed on right tank, the L then points to the engine and right tank. Fuel is carried in two 30-gallon rubber cells, one in each wing. Standard supply is 50 gallons for normal four-place operation. An extra ten gallons can be carried if additional range is desired. Fuel quantity in each cell is shown continuously by two indicators on the panel. Between them is located the fuel pressure gauge. Pressure is supplied by an engine-driven pump, augmented by an auxiliary electric pump used as a safety measure for take-off and landing.

At this point I was ready to fire up the 180 hp Lycoming. "How about starting procedure?" I queried Graves.

"Conventional," he replied. I followed the normal sequence: master switch on, auxiliary fuel pump on (operation is indicated on the fuel pressure gauge), mixture rich, carburetor heat cold, primer locked (engine was warm and needed no priming), throttle pumped several times and then cracked, ignition set on "Both", and then after clearing the prop which was set in "high rpm" the starter button is pushed.

The Lycoming danced a little as the cylinders began firing and then settled to a smooth idle. I released the parking brake, advanced the throttle and the Comanche began to roll on the hard surface. Two major features

became manifested during the taxi down the runway.

First, the control of the Comanche on the ground: sitting on the low, wide, tricycle gear and in a level or "in flight" attitude, the ship has a very stable feeling. The nose wheel steers smoothly and responds instantly without any "looseness" in the feel of control via the rudder pedals. It can turn through a 50-degree arc.

Second, visibility on the ground is excellent over the nose and down the left and right oblique. The swept roots of the Comanche's wing open an area usually blocked in other low-wing aircraft. This feature also adds to improved downward visibility in flight.

By this time we arrived at the end of the runway. Following Graves' suggestion, I checked mags at 1,800 rpm and the pitch change of the constant speed prop at 2,000 rpm; also the fuel selector valve, and elevator and rudder trim for take-off position. Flaps were not lowered after being checked, as Graves reported they are not needed for normal take-off on hard surface. On soft fields, the first position is recommended. Flight controls were operated through their full range and we were ready to go.

Clearing ourselves, I squared the Comanche down the runway and fed in the throttle. The Lycoming wound up with a sophisticated snarl and the Comanche accelerated rapidly. Light pressure on the pedals kept the ship straight, I applied a little back pressure on the wheel and let the Comanche fly itself off in approximately 800 feet. The nose wheel came up first and shortly thereafter the ship lifted in a positive manner.

Upon breaking ground and rising to three or four feet, I relaxed on the wheel to check stability at this critical stage of flight. On its own, the plane had no tendency to roll or pitch. I applied back pressure to climb, simultaneously flipping the gear switch to "Up." The gear light came on in a few seconds. With the ship cleaned up, I went to a power setting of 25 inches manifold pressure and 2,450 rpm. At an indicated airspeed of 95 mph (best rate of climb speed), the Comanche took Graves and me upstairs at 1,000 fpm.

Climbing through a layer of rough air, we found things stable at 4,000 feet and headed down-river toward Lock Haven with the Comanche on the step. With a power setting of 22 inches and 2,400 rpm, the indicated airspeed was 150 mph. After a few sweet moments of "just flying" we got into the following checks:

Directional and horizontal stability—To see how the Comanche performed with "hands off," I reached overhead to ascertain that the trim was proper for level flight. Then, with controls free, I observed its flight path and direction. The altitude was held, but I noticed a slight left turn when checked against a point on the horizon.

"Needs a little rudder trim" commented Graves, as he detected the slight turn about the same time as I did. I made a small adjustment on the rudder trim and this corrected the condition. The Comanche flew straight and level with hands off.

To further check directional stability, I again chose a point on the horizon in line with the nose of the Comanche, pushed in right rudder and skidded the airplane for a few seconds. Upon release of the rudder pressure, the nose went back into the point on the horizon. The check to the left was equally satisfactory.

To check horizontal stability, I pulled up the nose (power setting at cruise) until the airplane lost 20 per cent of its airspeed and released the wheel. The Comanche lowered its nose, picked up about 160 mph in the bottom of the oscillation (it is redlined at 200 mph), and then started in the up cycle.

At the top of the first oscillation, the airspeed was 135 mph and then the nose started down—but this time it went just slightly below the horizon, indicated 155 mph, and stabilized in a second or two on the horizon at 150 mph. Total oscillations: about 1½. This compared favorably with other aircraft I have checked. Some take 2 to 3 oscillations to recover.

Speed variation in steep turns—Some aircraft with laminar flow wings have possessed a tendency to lose airspeed in a tight turn—as much as 30 mph. To check the Comanche, I asked Howard to make steep turns to the left and right, and to call out the degrees as we passed through them. I glued my eyes to the airspeed indicator. We found that:

Left steep turn

0	degrees.....	150 mph
90	"	147 "
180	"	145 "
270	"	142 "
360	"	140 "

Right steep turn

0	degrees.....	150 mph
90	"	148 "
180	"	145 "
270	"	146 "
360	"	148 "

Stalls—First I tried a stall at cruise power to see what angle could be attained before the Comanche would fall through. Pulling back on the wheel, the nose went higher and higher. At an uncomfortable 60 degrees, the Comanche buffeted to let me know a stall was knocking on the door. If the control wheel pressure is released at that time, the Comanche immediately flies itself out of the stall. In power-off stalls, which occur at about 58 mph with gear flaps down, there is also good aileron control down through the stall which usually ended on the horizon line. Rate of sink in a stall was about 350 fpm.

Upon completing the first part of the checks, we landed at Lock Haven to see the Comanche under construction. On the base leg and after the airplane has been slowed down below 125 mph, the gear is lowered by flipping the switch to the down position. Turning on to the approach, the airplane is slowed down to 90 mph as flaps are applied as needed. The first position of flap is nine degrees, the second 18 and third 27. When flaps are lowered there is no tendency for the Comanche to "balloon" or pitch up. To the contrary, there is a slight pitch down, as though the craft is compensating for the increased drag.

Over the fence, the Comanche is slowed down to 80 mph, and speed further reduced as the flare-out is made several feet above the runway. Held in a level attitude at this point, the plane settles softly through the ground cushion and sticks to the runway. To complete the landing, a little forward pressure is applied to put a normal load on the steerable nose wheel. Landing roll is near to 600 or 700 feet.

At the Piper factory, I met Fred Strickland, chief of design engineering, who took me on a tour of the Comanche assembly line. Major points made by Strickland were:

Airframe construction: The Comanche is of sheet (*Continued on page* 82)

Head-on view of Piper Comanche shows how its design permits short landing gear legs for resulting sturdiness and weight reduction.

IS FEAR OF FLYING NORMAL?

The Chief Psychiatrist of the Fifth Air Force in Korea studied combat crews there to find out.

By RICHARD J. DOWNS

ARE YOU AFRAID to fly? If you have made even a few flights, there is no doubt your answer will be negative. How you react to the question—the amount of thought you give to your answer, the confidence or cock-sureness of your reply, even your ridicule, will provide a good indication of your flying experience level.

If you are a student pilot, you may point to the fact that, for thrills, flight is unsurpassed. If you are logging time in three and even the low four figures, your reply will probably be an indignant, "Heavens no, I love it." You professionals and old timers may pause a moment to consider the motives behind your thoroughness and constant precautions but will finally answer with a confident, "No."

The truth is, from a psychiatric point of view, we are all born with a basic fear of flying. Our emotional outlook toward it is determined by the manner and the extent to which we have adjusted ourselves to this basic fear. In some cases, this adjustment never occurs, resulting in serious emotional disturbances.

In recent years, aviation medicine has placed more and more emphasis on the emotional problems of flight. Military aviation has been vitally interested. What causes a supposedly normal and experienced air crew member to suddenly develop an irrational fear of flying sufficient to threaten or impair his proficiency?

To find the answer, the United States Air Force assigned Dr. Clinton E. Tempereau, Chief of Psychiatric Services for the Fifth Air Force in Korea, the task of evaluating all "fear of flying" cases in this theater.

In a recent paper published in the American Journal of Psychiatry, Dr. Tempereau has described the methods used and the results of this evaluation. He believes the most striking result was that, out of all the flying personnel in Korea, only 15 cases of actual fear of flying were found there. He attributes this amazingly small percentage to low combat losses, sensible rotation policy, and the generally high caliber of men selected as flying officers.

During the 17-month period of this evaluation, he was able to observe a very large cross-section of flying personnel. As is often the case in the study of the abnormal in human behaviour, his findings threw considerable light on what could be considered normal.

He substantiated the theory that a basic fear of flying is normal. This had been established in an earlier study by Col. Lucio E. Gatto, Consultant in Psychiatry for Far East Air Forces, who described it as follows:

"Undoubtedly all persons who desire to fly—that is to be sustained in the air with no visible support from the ground—originally possessed a basic, perhaps instinctive fear of flying, through the knowledge that a failure in the mechanism of being sustained in the air could result in injury or death by falling through space with great force until impact is made with the earth."

In summarizing what he found to be normal, Doctor Tempereau says, "The process of attaining a calm, mature approach to flying, in pilots and passengers, involves passing through certain distinct stages during which the mechanism of repression is in operation."

He found this normal process to consist of three stages. The first stage he terms, "The Initial Thrill." We can all recall the thrill sensation we felt on our first few flights. It is common to students and passengers alike and is much the same feeling of excitement we get on a roller coaster. It is an exhilaration born of denying fright. He terms it, "masked fright."

The second stage is, "The Hot Pilot." After telling ourselves often enough that we are not afraid, we come to believe it. When this occurs, the thrill passes and we enter the much longer intermediate stage. Now, our basic fear is completely repressed and affects us more subtly. Flying seems to satisfy a fierce emotional need. It is both a release and an expression of our ego. The bewildered girl who rebukes herself for being jealous of an airplane has some cause for jealousy. In this stage, a pilot's identification with his airplane assumes an almost narcissistic attachment.

The third stage is, "The Airplane Driver." This is the final stage in the normal pattern; the desired goal of pilot and passenger, alike. Doctor Tempereau says, "It arrives after long experience and the development of emotional maturity." Flying is a job—exacting, pleasant but routine. The basic fear has been pulled out of the closet and accepted in its true role—a latent stimulant for use in emergencies.

Where does abnormal or irrational fear of flying enter this orderly progression? Doctor Tempereau considers this a fourth stage in which there is a re-emergence of fear or anxiety. When this occurs, it is generally during either of the first two stages and causes the person to by-pass the third stage.

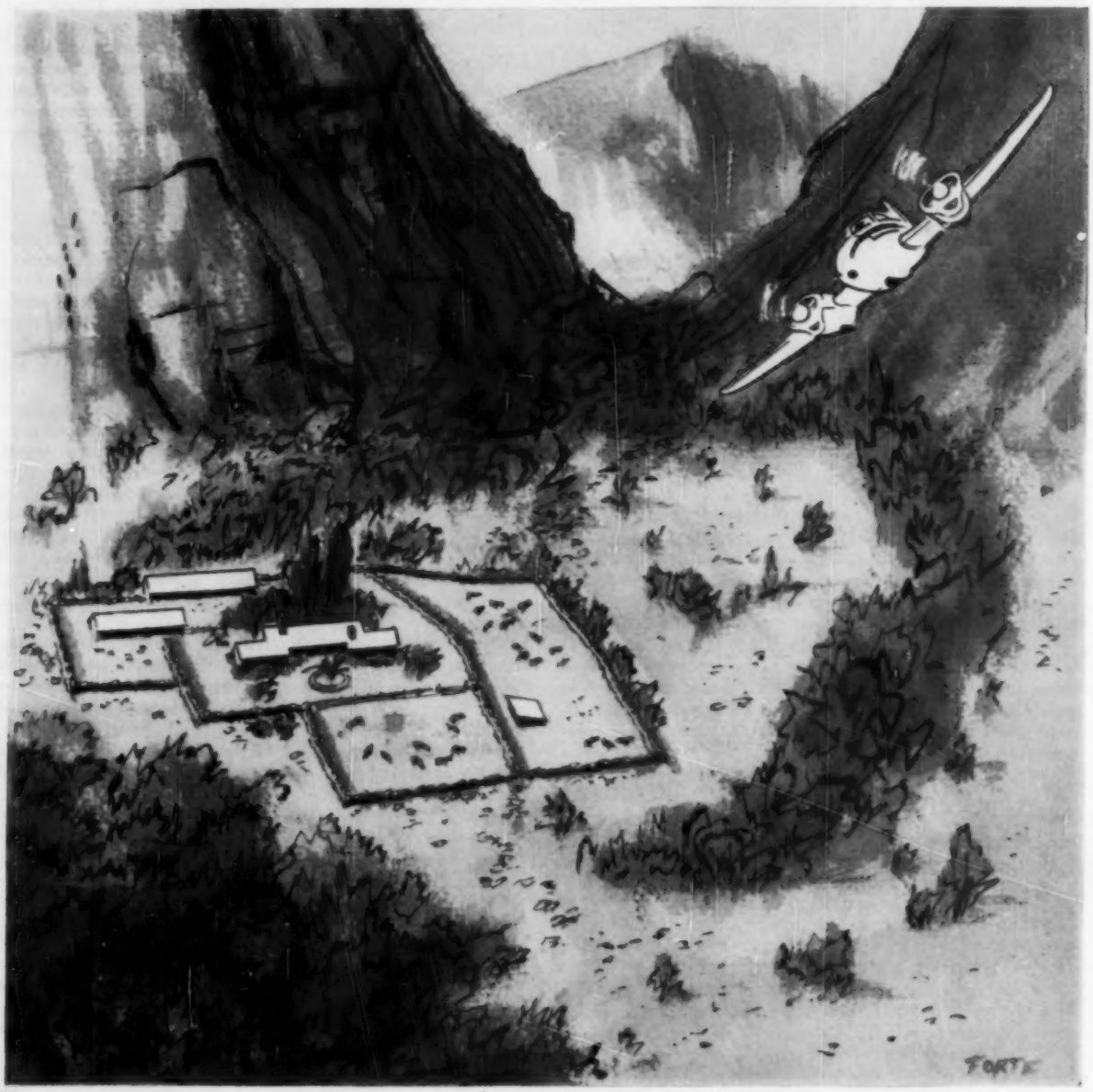
Naturally, the emotional factors involved are as manifold as the backgrounds of the individuals affected. The precipitating causes, however, are more specific and involve a severe emotional shock. Typical examples are an accident, a close call, or, in some cases, nothing more than a symbolic event.

Doctor Tempereau points (*Continued on page* 66)

R. C. "Tex" Marshall, air-mail pilot

FLYING DOWN

"As I flew along, I thought of the other pilots who had flown the Mail on this



MEMORY LANE

R. C. "Tex" Marshall, rancher—1958

route—Perhaps they were with me in spirit this trip . . ."

By R. C. MARSHALL

FROM MID-1924 until July 1927, I lived in Reno, Nev., and flew the Reno-Salt Lake City Division of the Air Mail, operated by the U. S. Post Office Department.

For many years I have wanted once again to fly over this route I had covered so many times, more than 30 years ago.

The Annual Reunion of the Western Division of the Air Mail Pioneers in Reno, the 6th and 7th of September last year, gave me a good excuse to retrace once again that rugged trail.

Leaving my ranch at Milnesand, N. M., at 6:30 a.m. on September 3rd, I arrived over the Wasatch Mountains east of Salt Lake some 800 miles away at 11:15 a.m. As I glided down over the city, I tried to pick out familiar buildings. The area had developed so much since I knew it intimately that I could now recognize only the Temple, the Utah and New House Hotels, and a few other buildings.

The last time I passed this way in a DH-4, there were broad fields and farms between the city and the airport, west of town. Now the buildings reached beyond the airport. Instead of craning my head out of the cockpit to see past the exhaust stacks of the old Liberty engine, my helmet and goggles marking lines on my face, I sat looking through what a friend has called, "A Bay Window in Heaven." No longer did I look for the wind sock on the rusty old hangar, but was told by the control tower where and when to land.

Parking the Apache, I stood by the wing and looked for one familiar sight. There were none. All gone. The two cinder runways, perhaps 2,000 feet long and always rough from the tail skids plowing through the cinders, were out there somewhere, under long, hard-surfaced runways. The rusty "tin" hangar with the few wooden buildings around it that sat by the gravel road from Salt Lake was gone—gone like Otto Preager, Paul Henderson, Steve Cisler, D. B. Colyer, Barney Mein, and many others, and like this old airport, are just memories in the hearts of those who, like myself, have lived through the changes.

Taking a taxi to the New House Hotel, where I used to spend stop-over nights when flying the mail, time rolled back. I was given the same room that had been reserved for us pilots of yore. At 7:30 the next morning I left the airport on my anticipated trip over the route I last flew on the morning of June 23rd, 1927—Salt Lake to Reno.

Fate seemed to be smiling on me this morning, for it was clear and calm. Remaining on the deck, I headed for the Lake, laying my maps away. This was to be my trip down Memory Lane, and I would not need a map of any kind. There was a song in my heart. The motors to my left and right seemed to be humming in sympathy with my mood. Man may change the cities, build new roads and dams, but I knew the mountains and wastelands of this strange land would not be changed.

Passing over the shore of the Lake I was surprised to see how the water level had fallen. Antelope Island, once two or three miles out in the lake, has disappeared. A wide strip of dry land lies where the water used to be. I had almost forgotten what a lovely shade of green is the water of this lake. Soon I had passed over its southern end, on past Dells, then over the brown sands of the eastern edge of Great Salt Lake Desert.

Memories were associated with each landmark. They seemed like remembered friends. I almost heard them say, "Welcome back pilot; we have missed you, as you have missed us." The brown sand gave way to the white salt of the real desert. Water marks high on the mountains around the desert were as plain as I remembered them.

Approaching Wendover Air Force Base, I obtained permission to pass through their control zone on the deck. Soon the Ruby Mountains, 12,000 feet high, could be seen ahead, but I remained low for I wanted to find that big ravine. Sure enough, there it was. Well do I recall a late afternoon of one winter day. Flying west, a heavy snow storm had forced me as low as I could get. Threading up this draw with the wind packing hard gusts of snow, visibility had become almost nil. Passing a low bluff, I had glimpsed a house half dug into the bank. In the open door stood a woman, outlined by the light behind her, watching me. Suddenly, I had been the loneliest person in the world. So close to warmth, safety and shelter. But not for me.

Now close to the mountains, climbing steeply, I passed over the eastern escarpment at 11,000 feet and was above Ruby Valley. It had changed little, perhaps a few more houses and cleared fields. Almost surrounded by snow-capped mountains, there is abundance of water to irrigate the hay and keep the valley green. I wondered if the Basques from the south of France still lived in this valley, as they did in my day. Then on over Secret Pass on the west side of the valley. In the distance behind that low range of mountains lay Elko.

As I flew along, I thought of the other pilots who had flown the Mail on this route, and died somewhere along it —Mouton, Vance, Blanchfield, Sharpnack, Maroney, Scott, Barnes, many, too many. Perhaps they were with me in spirit this trip.

Landing on the fine Elko Airport, I parked the plane and sat thinking of the last time I had sat down there. Instead of the fine, long, hard-surfaced runway, there had been a dirt strip with a wooden bridge in the middle. How careful one had had to be. When the tail skid had passed over the bridge, it would sometimes have (*Continued on page* 90)

PILOT? WHO, ME?

By BETTE CROOK

IT WASN'T THAT I really wanted to become a pilot—height, even that from a step ladder, terrified me. Yet there I was that January day, in the cabin of our family plane, sitting at the end of the runway, awaiting take-off instructions from the control tower at the Detroit City Airport. I was to make my first solo cross-country, a 90-mile hop to Tri-City Airport southwest of Bay City and return.

Perhaps I was there because my doctor-husband had said, "You can travel by car if you wish. When I go it will be in my own plane!"

Or maybe it was because I wanted to know something about flying since that was to be the transportation for my family, a daughter 12 and a son, 11.

But mostly, I think I wanted to prove to myself that my fear of the unknown sky, coupled with my own fear of high places, could be overcome by determination and the proper approach.

Whatever it was, there I was, after hours of practice and much patience on the part of Chuck, my instructor. The time had come! I was outbound on my own. It was like a hypodermic injection, feared but necessary.

Knowing that I was as well prepared as possible at that stage of my flying, and with maps and protractor on my lap, microphone in hand, I looked at the overcast sky and snow-covered ground. A check had assured me that my trip would be safe, weatherwise; I was accustomed to overcast and snow. But I was frightened to death!

"One—three—poppa, ready to go anytime," I said into the mike. (13P are the last three NC numbers of the plane, our identification call letters.)

The tower operator replied, "One—three—poppa, move into position and hold."

I did, carefully pointing the nose of the plane down the center of the runway, then setting the gyro compass.

"One—three—poppa, cleared for take-off," said the tower operator.

I pushed the carburetor heat knob once more, just to be certain it was in position, and applied full throttle, or rather, tried to. The engine stopped completely.

Realizing that airport traffic has to move, I knew I couldn't sit there. A brief moment of indecision—should I call the tower and ask what might be wrong? Everything had been done according to procedure but this was a new experience. One thing was certain: I had to get off the active runway. Besides, I didn't want to be too much of a nuisance to the men in the tower. They must have their own private opinion of student pilots, especially women students. I nursed an extreme inferiority complex because of my sex. Aviation was a man's business in my book!

I hit the starter and again applied full throttle. With engine roaring, the little plane started its take-off run. The runway slid away beneath the wheels and there was the ground, 400 feet below me.

It would have been so simple to stay in the traffic pattern and return to the field to ask whether or not there might be engine trouble. However, it was running smoothly by then and the plane climbed irrevocably out of the pattern. Actually, the only unpleasant result of the take-off episode was my certainty the engine would stop every time I applied carburetor heat, and I used it often that day.

"Really," I said to myself, "if something were wrong, you'd know it by now."

And now to find myself on the map. The little plane cruised along smoothly, its nose pointed toward my first check point. This was actually easier than getting out to the practice area. There was Selfridge Air Force Base off to the right. No jets in the air, thank goodness! It seemed a shame there was no one along to appreciate the good work I was doing. Every check point was exactly where the map showed it should be. True, with their blanket of snow, lakes and fields looked much alike, except where fishing shanties dotted the lakes and made identification positive.

There to the left was Flint, with its factory smoke, supplying the answer to something which had puzzled me. Flying from check point to check point is easy when the visibility is good. I didn't have to watch my compass, but infrequent glances at it showed that the plane was pointing more and more to the west, yet there I was on course. The wind, directly from the west as indicated by the smoke, was pushing me sideways, but I was correcting for this drift without realizing it. Well, to repeat, when you can see where you're going, it's easy.

Next came Saginaw, the river and the railroad tracks, and sure enough, exactly where it should be was Tri-City Airport. I "had it made" and I was jubilant.

Apply carburetor heat, reduce throttle, get into the traffic pattern after carefully studying the tetrahedron to determine which runway to use. Simple! With wind from the west, final approach should be from the east and into the wind.

Not so simple! On that snow-covered airport, there was no east-west runway to be seen and no control tower to give directions. A plow was shooting snow high into the air as it cleared the NE-SW runway. That seemed odd,

The Pilot? Yes, she!

Fly? Until that moment

I had no intention . . . tomorrow,

or any other day. Suddenly I knew

I was through the barrier.

Achievement was mine!

and I felt a slight twinge of uncertainty. However, Civil Air Regulations for Pilots had the answer to my problem. I remembered it stated quite clearly that when the wind indicator specified a certain runway, yet air traffic was using a different one, the pilot should do as other traffic was doing. Therefore there was no problem. If the NE-SW runway was cleared, then obviously that was the one to use. A crosswind landing might be tricky, but I had had some practice.

I established a base leg into the wind and turned on final approach, wanting to touch down as near the proximal end of the field as possible in order to lose speed and stop the plane before reaching the far end. If it were slippery, the brakes would be of no use—knowledge gained from a harrowing experience two weeks before.

If only that snow plow would move out of the way. Couldn't the driver see I needed every inch of space. There was no other way but to come in high and land beyond him. Apply more throttle, pass over him at a safe altitude, establish a glide. All that remained was to keep the right wing down and hold left rudder to maintain a straight approach. Ten feet over the runway I slowed down, prepared for the stall which would put me on the ground. But I couldn't hold the plane. The wind picked up the right wing and threatened to tip me over, no matter how hard I fought. The end of the runway rushed toward me. I'd have to go around. The plane touched down just as I hit the throttle and was again airborne.

This time, the snow plow was farther down the runway; there should be ample space to land if I weren't tipped over. My icy hands were slippery on the wheel as I held it far to the right, coming in on final for the second time. The gusts were just as strong, the plane as wobbly but with a little power it was easier to control. Then the ground was solid beneath my wheels, but I was trembling so that even taxiing was difficult.

The coffee shop in the airport terminal was my first destination after parking the plane. Strong hot coffee—it just might help! One of our Detroit pilots was sitting at the counter. "How was it?" he asked. I told him. He was as gentle as possible in revealing the truth—all the pilots who really knew what they were doing had used the east-west runway, even with its thin blanket of snow. They knew where it was!

Half an hour later, the man in the CAA Communications office drew a diagram of the field and gave me specific instructions for taxiing out; then he signed my log book. With a fresh supply of gas in the tanks and my signed log book in my pocket, there was no excuse for delaying my departure for Detroit. Honestly, I would have preferred spending the night on a bench in the terminal to climbing into the cabin of any plane again that day.

Elbert Hubbard once said something about "self-control, self-reliance and self-respect." In flying, it certainly applies. I had to get back to Detroit under my own power, still trying to prove something to myself more than to anyone else. In addition to that, my children would be home from school and expect to see me in the kitchen, preparing dinner.

Into the air, into the pattern, gain altitude and head for home. It should have been easy, but I'd forgotten to set my gyro while on the ground and I just couldn't tell the north from the west section lines. With the plane bouncing and climbing, the magnetic compass wouldn't settle down so that I could read it accurately. At last, as it swung past 90 degrees, I set the gyro and hoped for the best. Saginaw was just ahead of me and there were the railroad tracks which were my check points. I headed for them. Darn! The gyro wasn't working. It indicated a course of 185 degrees; I knew I was headed at least 140 or 145 degrees. If the magnetic compass would stop swinging, I could be positive. I headed down the railroad tracks and decided that I would probably find my way home even though the visibility wasn't as good as it had been.

Ten or 15 minutes elapsed; 20 to 30 miles had been covered. It was strange how the check points looked so much different when approached from this direction. Then came the horrible realization that I had never seen this territory before, at least never from the air. I was lost. With that admission came near panic. Too late, I remembered the warning against using railroads in a town for check points; I had followed the wrong ones.

The compass, now steady, read 185 degrees—approximately 50 degrees off course, and 30 minutes had gone by since take-off. "So now you look at the compass and believe it," I thought. "Why didn't you believe it back there over Saginaw when it indicated you were flying south instead of southeast? Oh, no. You recognized the railroad tracks! You thought you knew better than to trust a brainless instrument."

Minutes passed. I flew a zig-zag course, frantically studying the ground below. At 900 feet, I could see children romping in the snow. My own would be home, wondering what had happened to me. Worry about what I would cook for dinner when the time came became practical certainty that the time would never come, at least not tonight. True, I could fly another two hours on the gas in the tanks, but where would I be? The possibility that I might be flying illegally haunted me. Could I see three miles? I knew I had a 1,000-foot ceiling, though not much more. What had happened since I checked the weather at Tri-City? The fore- (*Continued on page 88*)

CREW CHIEF. James T. Pyle, Administrator of Civil Aeronautics, right, served as crew member on the CAA B-57 jet bomber used to check airway aids at 40,000 feet. Giving him the word, is Bascom Lockett, Jr., head of high altitude checking program who acted as pilot.

TIGHT FIT after a Connie. TWA captain Tom Cassutt grins from the cockpit of the midget racer which he designed and built in his spare time between flights to Europe. He is now working on his second.

COMMUTING STUDENTS Stanford Williams, left, and Kenneth Brashier of University of Southern Illinois, fly home every week-end in the Cessna 170 belonging to Williams' father.

AIRMAN'S ALBUM

BEAUTIFULLY restored, this Monocoupe 90A is the proud possession of Rusty Heard, Eastern Airlines captain from Miami, who also owns a vintage Laird.

MATS GENERAL Edwin M. Day smiles his approval at the controls of a Lockheed C-130 Hercules turboprop transport at Orlando, Fla.

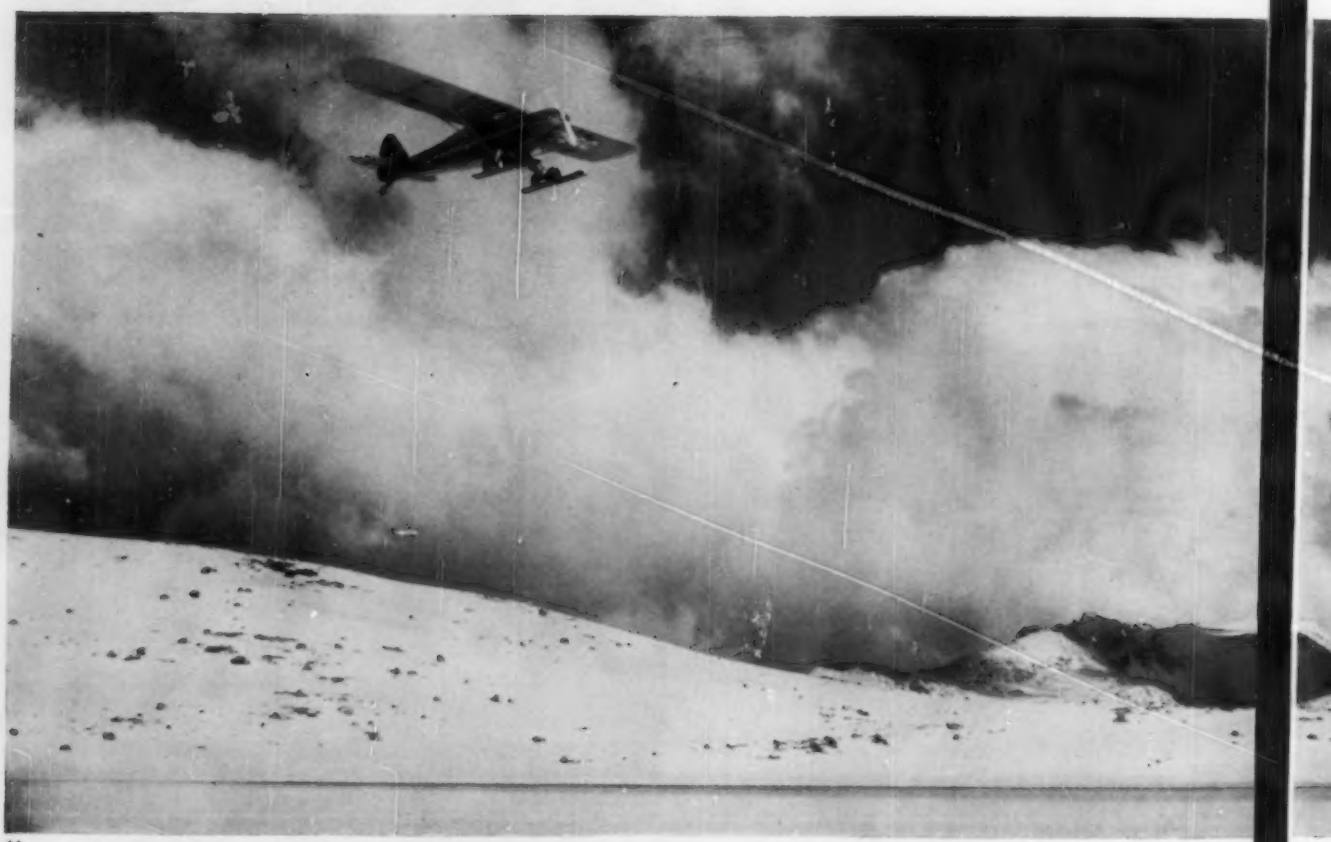
POINTING at two transcontinental record holders, Capt. Robert Kilpatrick, left, and Lt. Gustav Klatt, Gen. O. P. Weyland seems to say: "They're my boys."

VERSATILE Mrs. Barbara Kiernan of Andover, Mass. is part time helicopter pilot for Omega Aircraft and owner of a Beechcraft Bonanza.

PRESIDENT'S PILOT Col. William G. Draper takes time out to check out in a Trecker Gull. T. Lalley of H. A. H. Cook Assoc., distributors, stands by.

THE PRO'S NEST

There's no substitute for experience in any kind of flying. But to average lightplane pilots, "Br-r-r" weather asks **WHAT'S WITH WINTER?**



WINTER, TO THE AVERAGE lightplane pilot, is the season when he mentally buttons up his airplane and devotes himself to dreaming of spring. Oh, sure, he'll fly some when the weather is "blue-card" but the usual reaction to winter is just—"Br-r-r!"

Now, there is nothing wrong with the cautious approach, unless caution breeds timidity through sheer ignorance. The fact is, winter is as good a time to fly as any and, in some ways, better. For instance, you often buzz blithely along at 8,000 in mid-summer, in high humidity and with an outside air temperature of 65° F. Then your engine may conk out. Carburetor ice will be the demon-in-charge, and you'll be two jumps behind because you weren't expecting it. In winter, you probably won't have such an emergency because you anticipate temperature problems. Your carburetor, of course, doesn't know anything about the seasons and simply reacts to atmospheric conditions. Moisture plus temperature-drop equals ice, if the drop is to the freezing point, any time of year. You, in winter, apply carburetor heat. If you know your atmospherics, and prepare properly, you will do the same in summer, but in winter you are more likely to be prepared.

"Preparation" is the key word. In winter, emphasis is simply placed on a few more areas. Weather is apt to be more severe. Not that the summer thunderstorm has to take a back seat compared to the winter cold front, but thunderstorms occur in winter, too, and some of them have hair on their chests.

Winter or summer, any pilot anticipating a flight goes over certain weather fundamentals. Lightplane pilots are often found at airports where meteorologists are not. In such circumstances, the pilot becomes his own forecaster.

By
GEORGE CORNELIUS
Commander, USN

He can usually obtain sequence data, either from a teletype machine, or by phoning a station which has one. True, it will usually be past information but this does not invalidate it. On the contrary, past information, coupled with present observations, gives weather trend. Conditions elsewhere, compared with conditions at your field, give a weather picture. Meteorologists use qualified information to make predictions and forecasts. You can do the same, keeping in mind that while your forecast may not be as good as the expert's, nevertheless it is better than a take-off into the unknown. It doesn't take a meteorology major to tell you it is silly to fly north into a squall line moving south.

Four areas are important weatherwise, on any flight. These are take-off site, route, landing destination, and alternate. You don't need an alternate if it's a VFR flight? Right—as long as your destination and route remains VFR. If either socks in, you need an alternate right then. If your route ahead goes IFR and you do a "180," then your take-off site has become your alternate. If your destination goes down and the route behind closes, you need someplace else to go. If you have planned for it, you won't panic or circle until you run out of go-juice.

Seven major factors influence the weather in your four areas of interest. These are the direction and velocity of the wind, the clouds, the ceiling, the visibility, the precipitation and the temperature.

The wind affects your take-off, your navigation en route and your landing. Certain parts of the world have prevailing wind conditions different in winter than in summer. Local conditions may change from time to time in ways unfamiliar to the stranger. Alaska, for instance, has its downslope "williwaws"—strong winds that sweep down from high mountains to play hob with the ETA's of uninformed pilots. In the tropics, the Equatorial Front, reaching its extreme northernmost position in late August and its southernmost in late February, changes air accordingly. Experienced local pilots, familiar with local conditions, should be asked for weather advice whenever possible.

Clouds move with winds, but only with the wind containing the cloud. A pilot on the ground can tell if high clouds are moving with or contrary to the surface wind. Even though the wind at your airport may be down runway 9 when you want to fly east, you may notice that the fair-weather, cumulus clouds with bases at 4,000 feet are moving east, the opposite direction from the surface wind, at a good clip. This tells you to expect a tailwind at 4,000. You should, however, know enough about clouds to avoid mistaking post-frontal broken cumulus for fair-weather cumulus, or you may ride that tailwind into a cold front.

Since the name of a front depends only on whether it is warmer or colder than the earth over which it passes, you can expect as many warm as cold fronts in winter. More than likely you will encounter both in the form of an occlusion, or mixture, of the two. Recognition of cloud forms can give plenty of advance notice on the type of weather to expect. In the wake of a cold front, expect strong winds and clear air with turbulence. A warm front is frequently followed by sloppy atmospheric conditions, ragged clouds and fog, but smooth air.

Ceilings and visibilities are generally higher in cold weather than in warm. Cold fronts, however, approach with less warning. A warm front will give plenty of advance notice in the form of lowering visibilities and ceilings, overcast, and perhaps precipitation.

Applied weather knowledge is useful knowledge. With alto-cumulus on the horizon, and knowing the direction of its approach, a lightplane pilot planning flight away from the frontal movement should lose no time in getting airborne. His promptness could (*Continued on page* 84)

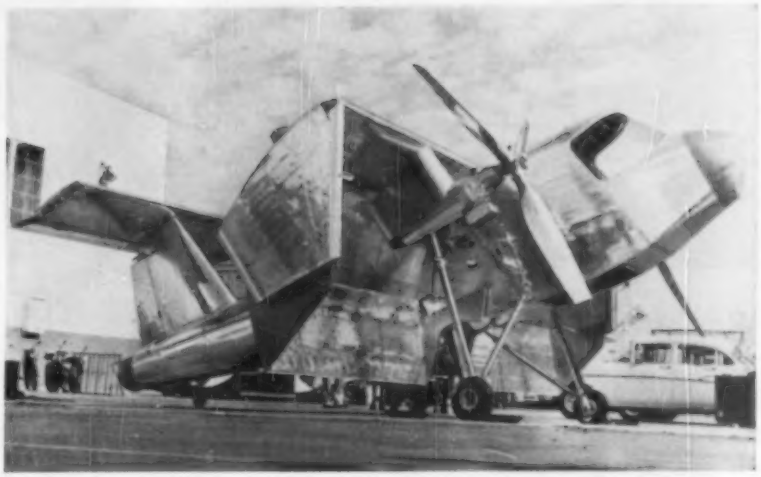
F-107 With near-Mach 2 capabilities both in level flight and climb North American Aviation's latest fighter-bomber presents a unique appearance because of the overhead air intake duct for its 20,000-lb. thrust Pratt & Whitney J75 engine. Good lateral control at all speeds is achieved by a spoiler system, seen in the photograph near the trailing edges of the wings, which consists of hinged doors on upper and lower surfaces. They control aerodynamically the air passage over and under the wings. The airplane has been delivered to the N.A.C.A. for flight evaluation.

HAVE YOU

BONANZA J-35 More power and speed are the features of the 1958 Beechcraft Bonanza. Engine is Continental 10-470-C equipped with continuous flow fuel injection and is rated at 250 hp. Top speed is 210 mph and cruising speed, 195 mph at 65% power. Other performance improvements include a higher service ceiling, 21,300 feet, and a range of 1,000 miles with adequate fuel reserve. A hydraulic governor maintains constant propeller speed to insure maximum performance from the engine.

CESSNA 172 FOR 1958 Left: Most of the changes in the 1958 model of the Cessna 172 are in styling and greater comfort. There is more leg room for the front seat passenger, better instrument lighting, a Neoprene seal on the left front window and a map pocket by the pilot's side. Complete new interior and exterior styling is available with choice of several attractive new color combinations. The only engineering change consists of re-forming the main landing gear springs to sweep the wheels three inches backward for better handling and ground stability. Price is unchanged.

RYAN VERTIPLANE Right: This latest VTOL aircraft uses the principle of "deflected slip stream" from the two propellers driven by a T-53 Lycoming turbine engine. The huge double extension flaps of the Vertiplane are shown here in fully deflected position forming, together with the down-tilted tip plates, a chute which directs the slip stream downward, providing vertical lift for take-off. Transition to horizontal flight is achieved by retracting the flaps to normal position. Plane was built under Army/Navy sponsorship by Ryan Aeronautical Corp.



SEEN?

LOCKHEED ELECTRA Below: First US-built turboprop-powered airliner rolls out from final assembly line at Lockheed's Burbank, Calif. plant. Airplane is powered by four Allison 501 turbine engines of 3,750 shp each. Capable of accommodating up to 91 passengers, it has a top speed in excess of 400 mph and a gross weight in the neighborhood of 100,000 lbs. Ten airlines have ordered a total of 141.

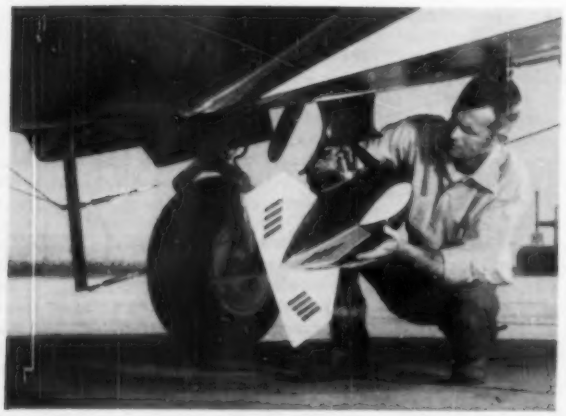
Magnetometer

A new technique has been developed in geophysical research by the use of simple airborne detection gear while flying over inaccessible terrain.

Pilot

By FRANK DEARBORN

The author with the 450-hp P&W-powered Cessna 195 which he flies.



Opposite page: Four "Super Cessna" 195's are operated by Hycon Aerial Surveys for geophysical research. The "bird" hanging beneath the airplane is the sensing unit for the Varian magnetometer. Above: Attaching the bird under the Hycon AT-11, also used in surveying.

FLYING A MAGNETOMETER exploration airplane is one of the rarest jobs in aviation and the most challenging I've ever had. For several years in search for uranium, pilots have been flying geiger counters and scintillation equipment up and down gullies at tree top level. But my job has nothing to do with that. Perfection of magnetometer equipment has now made it possible to locate non-radioactive minerals from the air. The magnetometer pinpoints ferrous deposits, indicates copper concentrations and shows areas of likely oil deposits.

I fly a modified Cessna 195 for Hycon Aerial Surveys, Inc. on assignments that pretty well cover the free world. This plane already has been all over the States, in Canada and Alaska and when this appears in print, I'll be cruising it up and down the face of the Andes, based in Chuquicamata near Antofagasta in Chile, with Magnetometer Operator Earl Buttick.

I doubt that any man could make a good magnetometer survey pilot without previous mapping experience. Just after World War II, Knute Melsom, a veteran mapper, taught me to "line fly." I was employed as a mapping pilot from that time until this magnetometer exploration became practical.

We use a very sensitive Varian nuclear resonance magnetometer to tell what lies beneath the surface of the earth. Briefly, this gadget is a coil wrapped around a bottle of water. The unit is mounted in an ADF housing and the complete "bird" is dragged at 90 to 150 feet beneath the airplane on a microphone cable. The magnetometer works on a basic principle developed by Dr. Russell H. Varian of Palo Alto, Calif. A pulsing elec-

trical charge aligns the hydrogen nuclei of the water in the "bird" and when the charge is cut off, the nuclei realign themselves in respect to the earth's magnetic field in that particular area. The results are recorded on film and punched tape recorders within the plane. This gear is so sensitive that we can record the metal in railroad tracks when they lie along our flight lines.

One great advantage of magnetometer surveying over topographic mapping is that you can operate in any kind of weather through which you can see. The only camera in our airplanes is a 35mm Automax spotting unit linked to our recording equipment with an intervalometer. We're not worried about the quality of a photograph as long as it shows enough ground detail to identify where the airplane was at that particular time. We also record our actual altitude from an APN-1 radio altimeter.

Geologists have long quipped that valuable mineral strikes are always found in inaccessible areas; and they aren't kidding. I've flown for hours at 500 feet without seeing a single spot where I could even crack up decently. One job in Arizona was among such rugged cliffs that I had to drop full flaps and sideslip

Ivan Sloan, left, Manager of the Survey group and Gunnar Edenquist, Senior Engineer in charge of aerodynamic design on the magnetometer installation, check the Varian magnetometer "bird" prior to flight in one of Hycon Aerial Surveys' planes.

2,000 feet down the sides. Even with the 450 hp powerplant, those ridges were too steep to climb, so all passes were made downhill. In extremely rough country I'm always looking for saddlebacks in case we hit unexpected downdrafts. Flying as close to the ground as we do, the contour turbulence frequently gives us a bad time. However, most of this instability close to the ground flows in a horizontal plane.

Technique for spotting mineral deposits calls for contour flying from 300 to 1,500 feet above the surface, with most flights being made at 500 feet. Some of our survey flights in New York state simultaneously utilized both the magnetometer and scintillation counter. The lower the altitude, the more precise the scintillation information on radioactive areas but the lower the altitude, the more restrictive is the magnetometer data.

Magnetometer flying is rough on pilots and planes, but even rougher on magnetometer operators. The operator sits backwards and many take dramamine to keep from being air sick. We try to use men with combined photographic and magnetometer experience, but there's a great deal of difference between shooting a camera at 16,000 on a stable platform and the roller-coaster ride you get contouring ridges at 500 feet. The mag operator should have enough electronic background to make repairs and assure that all the gear is operating properly. To guarantee that I don't get too close to peaks and snag the bird, I hop from side to side in the cockpit for a better view of what's ahead. Its power will pull our Cessna up 1,500 feet in a mile, but I can't see over the nose at that angle. Still, the Cessna is, I believe, the best magnetometer airplane available with the possible exception of the new supercharged Aero Commander.

Do I worry about flying inaccessible country in a single engine airplane? If I said that I didn't, I'd be lying, but our preventive maintenance is the answer to that. Only once have I had the engine cough. We were coming up over a ridge near Tucson, Ariz., without any place in miles for a forced landing and I pushed the nose down fast to keep my contour. There was a momentary negative G-load and a bubble of air got into the fuel line. The engine sputtered. Dr. Jim Gimlett, my magnetometer operator that day, really racked me back for that.

There's a lot of throttle jockeying in this work. You're either full on or full off and it's hard on powerplants. I usually check my engine instruments, particularly oil temp, oil pressure and head temps, between each low level run. When we're climbing the side of a hill, we'll draw 35 inches of manifold pressure at 2,100 rpm and pull up 1,500 feet in a mile of forward travel. Our prop controls are fitted with a Vernier handle so I usually roll in a couple of turns to pick up an extra 100 rpm before starting a steep climb. Then it's a question of applying enough throttle to keep the "bird" out of the trees.

The cloak and dagger days of mystery are relived in magnetometer flying. A geologist representing the customer normally meets the airplane after each flight and runs a preliminary spot analysis of results. Frequently these are telephoned to the home office and land leases are made at once. The final magnetic maps for the customer come through much later, and these usually point out the most profitable areas for either detailed ground surveying or core drilling.

We can tell during flight if we strike an anomaly. If the contract calls for it, we can double back and do a more detailed survey of that particular area before continuing with the rest of the flight. On other assignments we finish a whole area and then go into greater detail on the most promising areas. Since it is possible for the flight crew to know secrets about an area of which the owner may not yet be aware, we operate strictly as a surveying and not as an exploration company. By selling service only, and not being in the exploration business for ourselves, we are not vulnerable to temptation of withholding information.

I did the first evaluation flights on the Varian Magnetometer for Hycon Aerial Surveys in a Twin Beechcraft. We had not only to check out the recording equipment, but also the flight characteristics of the "bird". We had one "bird" with a single point attachment that would change angle of attack and fly up alongside the airplane, but a double yoke with some negative angle of incidence kept the "bird" beneath us. Now we can throw the plane in 70-degree banks and the "bird" stays right in place, though it does swing wide in a pendulum effect on turns. The first commercial flights made with the Varian Magnetometer were near Mt. Shasta near the California-Oregon border. That's rough enough country for any pilot.

The most difficult part of geophysical mapping, as in any other type, is the navigation: flying a straight line over the precise points. Before we go on any geophysical job, we have made up a set of high altitude photographs, usually by the Production and Marketing Administration (PMA) or the Soil Conservation Service (SCS). These prints are on a scale of 1:20,000. Our customer marks the area he wants surveyed and we put in flight lines from 300 feet to 20 kilometers apart, depending on the type of survey he wants. Our flight evaluations will also vary, depending on the detail required.

Finding check points for geophysical exploration is even more difficult than in regular topographic mapping. Radios must be turned off for all mag flying, so they are no aid to navigation. You're working close to the ground and there are almost always hills along the flight lines. There are no stakes or flag men for the magnetometer pilot. While his low "passes" may be somewhat similar to those of a duster pilot, he has to fix each starting and stopping point in memory. One area that we flew in Chile has not a single tree or bush for reference points. In this deserted area, check points are rock outcroppings or the faint tracks of flash floods.

I usually study the high altitude photos to figure out which lines to fly first. If the area is particularly rugged, I'll circle it before making the first passes. Then it is a question of picking out check points and (*Continued on page 79*)

Three aeronautical engineering students at Iowa State College use the school's Navion de luxe 205 for collecting flight data.

Unique training is offered these budding aeronautical engineers.

Flight test instruction at Iowa State

By D. W. HUIGEN

IOWA STATE COLLEGE has an aeronautical engineering program unique among professional schools. Iowa State is the only American college requiring "flight test" as a part of its academic schedule. Other schools charge extra fees for enrollment in such a course and therefore cannot make it mandatory. The Iowa course was inaugurated in 1946.

Three mornings of each week, Professor M. L. Millett goes aloft at dawn in the school's flying laboratory, a Navion de luxe 205, accompanied by three students. Each such flight session lasts from two to three hours.

Basic objectives of the course are to acquaint students with the methods of conducting tests and of reducing data to written report on typical flight test work. The recorded data falls roughly into four categories—(1) performance; (2) stability and control; (3) operation of equipment including engine; (4) structural integrity.

On a typical morning, Professor Millett and his group of three arrive at the airport by dawn. First they run a pre-flight check—weigh the plane, do a detailed check of the instruments and make other critical inspections. Then they proceed aloft for a series of planned maneuvers —speed runs, sawtooth climbs, stall tests, zero thrust glides and precision take-offs and landings. They also do fuel flow tests, consumption computations, control forces and kindred measurements.

After landing, the plane is again weighed and the instruments examined. Each student now has sufficient data from which to compile a test pilot report. Back in classroom the reports are studied. To supplement their actual flight test experience, students are supplied with hypothetical situations from which they conduct qualitative stability tests and encounter problems of flight testing provided by high speed and large dimension aircraft.

Professor Millett explains to the budding engineers that, whether an aircraft is designed for military or civil use, the eventual stamp of approval of the model must come from flight test. In fact the flight test section in any modern aircraft manufacturing establishment is one of the key departments of the organization. A young engineer who knows his way around at this level has a special advantage. There is no authoritative substitute for actual flight conditions. Here the airplanes are made or broken, regardless of how promising or problematic the prototype is anticipated to be by the designers and builders. It is well for the engineers to learn early that despite exact science, the human equation is never absent from the final proof of the pudding.

Aside from the early hours at which Iowa State College schedules its flight testing, the course is a favorite with engineering students. The early hours are chosen, of course, to escape thermal currents and give better chance for instruction. END

NO. 216

I LEARNED ABOUT FLYING FROM THAT?

The test hop of a surplus Norseman nearly spelled the shortest flight record of any airline.

By R. J. GOODRICH

AT THE CLOSE of World War II, I was attacked by the epidemic prevalent among ex-military pilots at the time—starting a "feeder" airline.

With a group of air-minded and solvent associates, my plan was to schedule flights to cities in northern Minnesota. There was no regular air service to the area, and the potential business of meeting the major air lines in Minneapolis and flying the folks traveling to the northern lake and resort areas looked promising.

We formed a corporation and filed application with the Civil Aeronautics Board. We proposed to buy three government-surplus, Norseman airplanes which suited perfectly our load and route requirements at the time.

The purchase and test hop of the first Norseman nearly resulted in establishing the shortest flight record of any airline.

Shortly after our decision to buy the airplanes, I hopped a Mid-Continent flight to Little Rock, Ark., and purchased a surplus Norseman which had 64 hours on it since new. It was fitted for Army troop carrier service. I was to fly it back to a former contract school where I had instructed during the war. I had confidence in their ability to convert and license the plane as a "deluxe" passenger carrier.

After a routine ferry flight to Minnesota in gloomy March weather, I parked in front of the shop and gave them the order to fix it to our specifications.

The shop manager promised he'd start on the job the next day. I took the bus home to northern Minnesota, after saying I'd return to check on the progress from time to time.

What I didn't know until much later was that, when I left, the shop crew attempted to pull the Norseman into a small building to start the job. Here they found the wing span was greater than the width of the hangar door, so they decided to take off one wing to get the plane into the shop. Due to the system of conduits, wires, etc. running to the wing, they abandoned that decision. After shuffling other aircraft, they put my plane in a bigger hangar.

Several inspection trips and a few weeks later, I was notified that the plane was ready to be test-flown. The great day had arrived! There stood the prettiest Norseman of all time, red with white trim, our large feeder line insignia on each side, the pilot's name on the door, and seven custom-made seats. It was a plush job throughout!

She was certified, licensed and ready to go. Everyone interested in the airline and those in the shop who had helped convert the plane were on hand to see her fly. I refused several requests to ride along on the first hop.

Proudly, I checked her all over, saw to my satisfaction she was ready, started her up and taxied across the big, wet, grass airport to take her up.

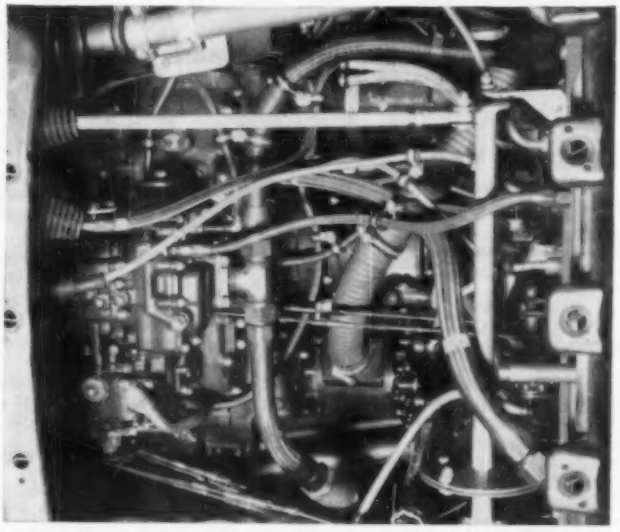
At the downwind end of the airport, I really checked her. Actually, no great alteration had been made to the engine and, I thought, to the airplane. She'd flown in from Arkansas and was perfect from a flight standpoint then.

That old Pratt and Whitney purred smoothly and the instruments all said let's go! I checked the controls. They were free and easy. To make sure, I opened the pilot compartment door, looked back (*Continued on page* 92)

A Super Ventura recently completed by Howard Aero, Inc., of San Antonio.

Howard Aero, Inc., Builder of Super Venturas, Standardizes On Aeroquip 601 Lightweight Engine Hose

FOR ENGINE FUEL AND LUBE OIL LINES



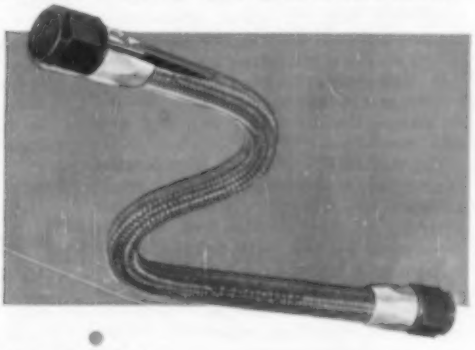
This P&W R-2800 engine on a Super Ventura uses Aeroquip 601 Hose and Reusable "*little gem*" Fittings for all fuel and oil lines.

"*little gem*" is an Aeroquip Trademark

Building luxury and efficiency into a business aircraft is the specialty of Howard Aero, Inc. Howard's busy San Antonio plant turns out a sleek new Super Ventura every three weeks. And, each of these executive planes uses Aeroquip 601 Lightweight Engine Hose for all engine fuel and lube oil lines.

Aeroquip 601 Lightweight Engine Hose offers savings up to 44% in weight and 42% in space (smaller bend radii) over conventional hose lines.

Get full information on this and other Aeroquip Aircraft Products from the authorized distributor listed below.



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Crossing the Andes in a 170

(Continued from page 25)

thoughts ahead to the towering mountains and the pass between Chile and Argentina where the "Cristo" stands.

We began to review our thinking to see if we had made an error in calculations. All objections mentioned had occurred to us before starting the flight and we felt that each had been solved. Frankly, we considered most of the pessimism due to lack of experience with both our type of plane and the terrain. We had flown considerably in the west where the Rockies are quite impressive and didn't feel that the Andes could be any worse. Most of those who doubted our wisdom were from areas where the land is flat. But, in spite of this type of rationalization, we did begin to worry.

The pass, according to the maps, was slightly over 12,000 feet. We had tested the plane to that altitude. The factory claimed it would go on up to 15,500 but their enthusiasm perhaps carried them away. A new model might go that high but ours with its five years and 250,000 miles was far from being new. And what if we really needed that extra altitude?

The question of oxygen had worried us because of the babies. Their health had been good on the trip and they had behaved well but would the lack of oxygen at altitude make them sick? Normally, in military flying, you start using it at 10,000 feet. We might have to go half again as high. The argument in our favor was the length of time we would be at that altitude. I estimated a maximum of 30 minutes. We could climb into the pass gaining altitude and, as soon as we crossed over the summit, could begin to let down. Total time above 10,000 might be half an hour. We had, of course, consulted a physician whose opinion was that no ill effects would be felt for such a short time. The turbulence to be expected didn't bother us too much, as we had planned on making the flight only on a day with ideal conditions.

The day finally arrived. After a good night's rest in Santiago, we were ready to tackle the most important leg of our journey. Weather reports from the pass were good but we were delayed at the airport by a bit of local fog. We waited impatiently until ten o'clock, when we received clearance to take off. The towering Andes, with their snow-capped tops, were impressive as we started the long climb to conquer them. We had 70 miles to fly parallel to the range before we would come abreast of the pass.

Our plan had been to get 10,000 feet before arrriving at the mouth of the canyon and then climb into it, gaining the other 2,000 feet between there and the summit. But shortly after taking off, it became evident that there were small clouds blocking the entrance. By the time we arrived opposite the pass, the clouds were bigger and completely obscured the mountains. Apparently, weather had changed radically since our earlier report from the summit. But there was a chance that this was just a cloud bank on the near side of the mountains and that the pass was still clear. If we could get higher than the clouds, we might be able to see through. We decided to keep on climbing, while holding our position by doing lazy circles. It looked as though the top of the clouds should be at about 12,000 feet and we were already at 10,000. Perhaps the build-up would be impossible to top but it was worth trying rather than go back to Santiago immediately. We finally hit 12,000 and could see holes through towering pillars of clouds whose tops were away on up. The clouds were mounting faster than we could climb.

As we crossed back and forth over the mouth of the pass with the cloud bank between ourselves and the mountains, we began to doubt that we could make it. We had already been above 10,000 feet for 15 minutes and would have to spend at least 30 more going across but we were almost up to 13,000 and it looked like there might be a good hole opening up. Suddenly, there was a break in the clouds and we could see the pass! The mountains beyond were clear of clouds all the way through to Argentina.

Blue sky all the way across! We turned toward the hole and started in. Suddenly the winds stirred the clouds and they swirled around us. We found ourselves half way through the cloud bank headed directly for the mountains but with no hole. We held a straight course on instruments for what could not have been more than 20 seconds but our anxiety was terrific because of our proximity to the peaks which were immediately in front of us. I was ready to do a 180 and get out of there when we broke through.

Never had we beheld such a scene. The view had been obscured by the clouds building vertically and now it was as if celestial curtains had been parted. Before our eyes lay the most magnificent scene imaginable. Wild, sawtoothed, snow-covered peaks extended to left and right and off into a mystic horizon. We had flown in the mighty "Rockies," seen photographs of the "Himalayas," but never has there been anything to compare with the awesome Andes. Seeming vibrantly alive in the brilliant sun, they thrilled us beyond words. The ruggedness is fearsome, yet enchanting. The coloring is spectacular.

The pass was right in front of us, so we began to thread our way through the peaks, following our course closely on the map and checking constantly. Following the tiny thread that was the railroad track, we almost flew into a blind canyon before we noticed that the track came back out again and went into another. We were at 14,000 now but the walls of the pass were still higher and the ground was getting closer, so we kept on climbing just to make sure. It was only a few minutes before the summit came into view and, by the time we passed over it, we had our full 15,000 feet and were sitting on top of the world.

It was so cold that we had to keep scraping the frost off the windows. Our moist breath condensed on the glass and froze immediately. I would scrape a hole on my side and have Meryl lean over to see my view. Then she would clear a peek-hole on her side and I'd look at her scenery. The size and grandeur of the mountains was so overpowering that I felt they were much closer than they actually were. At first I was afraid to turn the plane because the peaks seemed so close. As we became used to such magnificence and calmed down, it became apparent that we actually had more than enough room and could make complete circles in the pass with space to spare.

As high as the mountains were, it appeared impossible for nature to pierce the sky with anything greater, yet as we approached the summit we could see, off to our left, the towering glory of Aconcagua, the highest peak in all the Americas. No vocabulary can describe it. We just sat and looked at it in silence as we passed by. The beauty was actually a spiritual experience and we felt elevated by it. It seemed especially fitting to hold the children up to the windows and make a slow turn over the statue of Christ!

I must admit that we were a bit exhilarated. We had matched our 145 hp engine and small plane against the length of the hemisphere and the height of the Andes and had won. END

NEXT MONTH IN FLYING

T-EFFECT . . . A NEW PHENOMENON

An elusive "air cushion" that exists only in a narrow band of altitude above the sea materially aided a crippled C-97 to remain airborne for six hours over the Pacific before ditching.

BARNS INTRIGUE ME

Tracking down old airplanes can be a fascinating hobby. The author found a 1911 Thomas Pusher, piece by piece, and then the pilot who originally bought and flew it.

SALUTE TO PHOENIX

A municipal school system that has given more than 28,000 hours of flight training to its student body sets a fine example for air age education.

FROM KANSAS TO COSMOS

Flying the Spanish Main was the interesting assignment of an Air Force pilot from the Kansas prairies, when he operated an amphibious SA-16 supply line along the guided missile range.

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Post Mortem Is a Good Teacher

(Continued from page 31)

sooner than normal. Ceilings at Pisa were 1,200 feet. A quick check indicated ample fuel for Rome. I acknowledged and proceeded back to 39,000 for fuel conservation once more. There still was some ice and altitude was not easily gained.

Then, within eight or ten minutes, the fuselage tank fuel warning light came on. My first reaction was to switch to the leading-edge tanks to see if they would feed. They did. It could only mean one of two things. Either the inlet valve was stuck, shutting off flow from these tanks, or ice crystals had formed from condensation in the tanks and clogged up the pump screens. The aircraft had been sitting at Hahn in cold, rainy weather and was likely to have fuel contaminated with moisture. I was inclined to believe this theory. At it turned out, I was wrong.

Here, we were starting to get into trouble but nothing to get excited about. The only thing this is; one never knows in flying how fast trouble adds up. Maybe sometimes too fast, and maybe sometimes it just starts and then subsides. If I had guessed the valve was stuck and felt sure of it, I could have pressed the switch to "Fuselage By-Pass" which runs fuel directly from the wing tanks to the engine. I did not test this system because I did not want to risk a flame-out. That would mean dropping below 20,000 feet to get an "Air-start" and then wasting precious remaining fuel to climb back up to an economic altitude. There were from 120 to 130 gallons of fuel in the wing tanks which we could not use. We had just 190 usable gallons at this point.

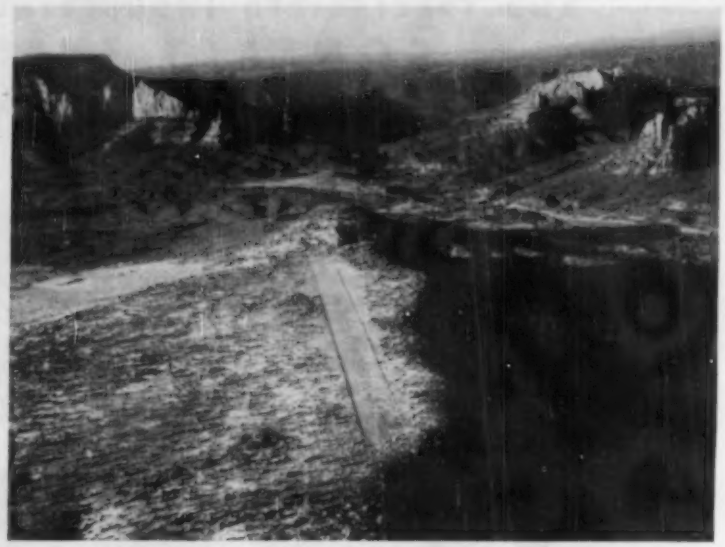
Quick calculation told me we could reach Rome but with no reserve. I didn't like penetrating that area without good radio reception. The icing had coated the antenna. This also effected the Radio Compass and it was dusk on the surface —poor reception time. The probability of poor fixes ruled out continuing to Rome.

By this time, I was thinking only of getting this bird on the ground. I told the Lieutenant in the back seat to tune in on Pisa. We would go back there. I felt we could make it without sweat. I switched the voice radio to "Guard" channel and started calling for radio fix assistance, declared our emergency and asked assistance. No answer. Surely someone must be guarding the emergency channel! No answer. I placed our APX-6 transmitter to code "Emergency" and called again stating I was squawking "Emergency." I stated we were returning to Pisa. No answer.

My partner could not raise a signal from Pisa Radio. It was now getting dark and reception, due to skip waves at this time of day, was erratic. I kept working the voice radio. Finally a GCI station answered. Their call sign was "Charlie #1" and I read them "five square," stated our condition and asked for assistance such as a fix and selection of where to land. They replied that they did not have me on their screen as yet but to take up a heading of north and fly this awhile. I did. Still nothing. They then gave me west as a heading. We flew this too. Still nothing. We tried all modes on the APX-6; then finally back to Emergency. We were getting nowhere. This was ridiculous. Surely some station was equipped with DF equipment and could shoot a fix on us. Yet we just kept flying square circles. I had throttled back to an indicated 130 knots and, iced up as we were, we could not bank over 15 degrees. There was sure need to conserve fuel.

I couldn't tell for sure whether my passenger was overworking himself on the radio with the situation pressuring him, or if we really had radio troubles. He could not get Pisa or any other known station in the vicinity. I asked him to fly

(Continued on page 58)



AIRPORT IN THE RED HILLS

SEDONA, Arizona, at the mouth of Oak Creek Canyon where the red rock cliffs have been backdrop for many a Western movie, is one of the beauty spots of the Southwest. Located on the main East-West airway, midway between Winslow and Prescott, Sedona has a new airport and was the locale for our cover picture this month.

Built atop a mesa some 500 feet above the town, the airstrip has an elevation of 4,300 feet. At present it is merely graded on the natural red clay of the mesa but both Federal and County funds have been allocated to stabilize the surface and eventually blacktop the flight strip and access road.

Transient pilots should circle the town before landing. Joe Mosier, airport manager and also proprietor of the local Shell Service Station, will send a car up the mile and a half road. He has 91 octane fuel and oil on the field; rental cars are available in town and nine motels are open all year.

The area is noted for hunting and fishing. Nearby fish hatcheries keep Oak Creek stocked with trout and two bucks were shot in two days on the airstrip during the deer season last year (Nov. 1-17). A combination trout and warm water fishing license costs $10 for non-residents while a special five day license is $3.

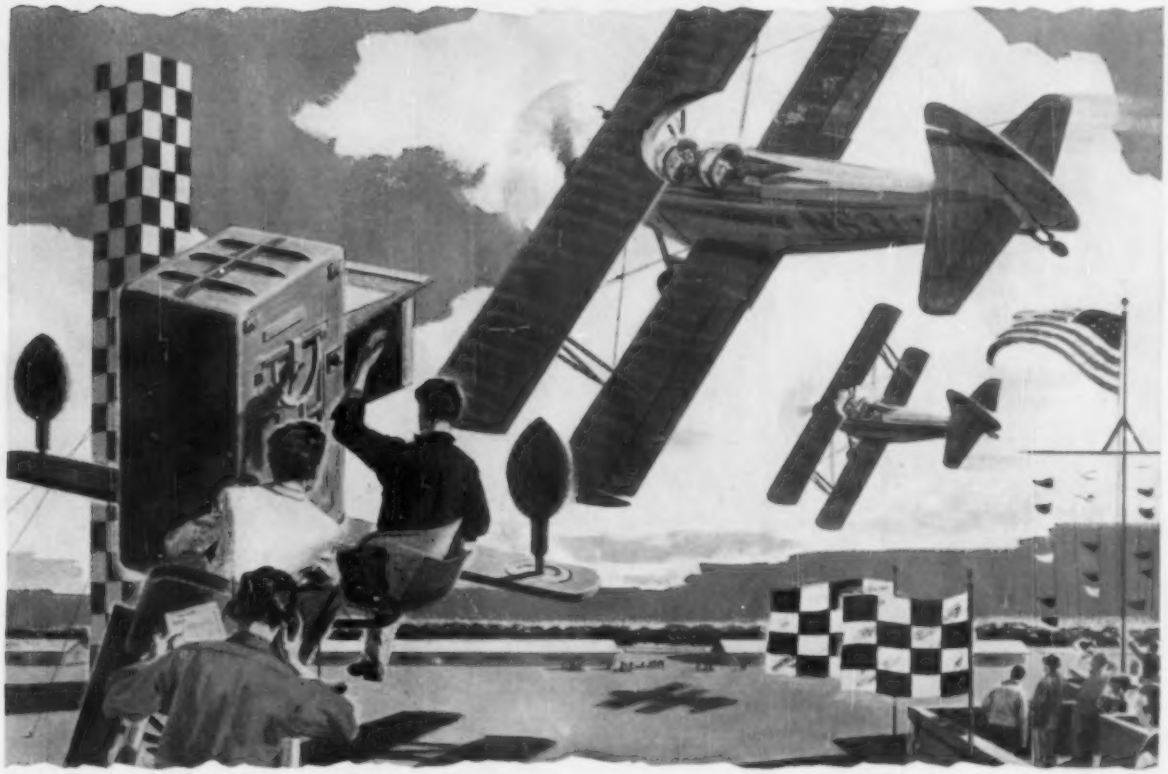
When high surface winds are blowing, transient pilots are cautioned to expect a downdraft on final approach. Also, since the runway is natural clay, it is both slippery and soft after a rain.

When we asked photographer Don Downie to get us additional pictures and a story on Sedona, he had one of those weekend flights that would have been better left unflown. It's quite a story and we'll tell it next month.

(Continued from page 56)

PLANE FAX

by STANDARD OIL COMPANY OF CALIFORNIA



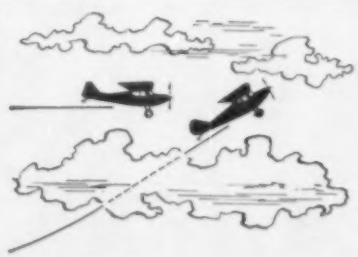
Realism in the movies with daredevil flying

When a movie script calls for pilots and planes to re-enact daredevil flying of the early 1930's, the producers often call on Joe Pfeifer. Hazardous flying of outdated aircraft is bread-and-butter work for him. Operating out of the Santa Susana Airport, in California, he and his fleet of 1930 vintage airplanes have appeared in many motion pictures based on early-time flying adventures.

"Hollywood makes two strong demands when shooting a flight scene," reports Mr. Pfeifer. "One is full power for realism and the other is minimum maintenance problems to eliminate production holdups. I get both with Standard aviation products. Chevron Aviation Gasoline burns clean, never fouls the plugs and gives me the extra power I need for movie stunt flying.

"RPM Aviation Oil keeps the aircraft in top condition and holds engine wear to a minimum. Rings and valves stay clean as new. I've had no engine trouble using RPM . . . and in my kind of flying that's saying a lot."

Mr. Pfeifer's fleet of 27-year old planes, the largest such group of aircraft still flying, includes a restored and modified Pfeifer fleet biplane, Phillips Skylark, Davis DWL and a Fairchild 22.



TIP OF THE MONTH

Avoid flying immediately below or above a cloud formation. Neither is a good place to be should another airplane suddenly pop out of the overcast.

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Operates on either 110 volts AC/DC or on its own built in batteries.
Light weight - only 3 1/2 pounds. Measures only 8" long, 5" high, 2 1/2" deep. Carrying handle folds into case.
Has 2 antennas: built-in loop stick is directional in operation and can be used, in an emergency, as a direction finding radio. The radio also has a whip type antenna that extends from case up to 29" high.
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(Continued from page 56)

and work with Charlie #1 while I tried my hand at the Radio Compass. This equipment is sometimes tricky and experience is often a big help. I found the same troubles. No station in our vicinity could be read clearly, although I used all selector positions and combinations. I had only been keeping track of our headings and times on these headings generally but will admit that I have never been more lost; and the time limit to find ourselves was becoming critical. The pressure was on!

The thought of bailing out was not so bad but we were uncertain of our whereabouts—whether over water or land. If we flew due north until out of fuel we would be over land but probably over the Alps in a January storm. We would be in water but whether in the Mediterranean, or Adriatic, we could not be sure. No one would know where to start looking. The night would be spent wherever we landed. We were happy we'd brought along our Mae Wests.

The impact of our plight sank in. We were sure there would be no help from Charlie #1, and no other station answered our calls. In exasperation, I finally scanned the full frequency band and picked out the loudest and clearest station signal for which I could get a compass swing. I then took over the flying again and turned into the station. This put us on a heading of 20 degrees. As we flew this heading, I contacted Charlie #1 and gave them the identification signals. The first and last letters were clear but the middle was garbled and we were not sure of it. For the first time, however, we were at least going somewhere. We could not identify the station yet in the Radio Facilities Chart, but the ground station had a better picture of the whole area. After five minutes on this heading, Charlie #1 informed us that the station was Treviso. A quick check of the Facilities Chart assured us of this station and told us where we were heading. Three minutes later Charlie #1 informed us that they were painting us thin on their scope. Another five minutes and they had us painting solid. Well anyway, here we were working on something.

Machinery on the ground was set into motion for our emergency and soon Charlie #1 said they had alerted Aviano Air Base and that we were 120 miles out. We were still homing on Treviso which was about 30 miles from Aviano. At 39,000 feet, our remaining fuel was 50 gallons. It was going to be a "sweat." I reduced power to 50 per cent and started down 1,000 ft./min. Ceiling for Aviano was 1,600 feet. No GCA there, but with a good GCI-controlled let-down we could make it with 1600 feet. We were estimating a deadstick and most likely gear-up clean configuration contact.

As soon as our position was known, we received calls from several stations instructing us to go into various airfields, all of them completely unfamiliar. I wasn't about to switch now. We were busy gauging time, distance, fuel, and other problems to make Aviano. We

(Continued on page 60)

HOW'S YOUR TECHNIQUE? MICROPHONE, THAT IS.

We sure run into some funny ones when it comes to service problems. One of our Narco tech reps loves to tell the story of a guy who flew all the way into the factory to get his radio fixed. After a bench check showed nothing wrong with his set, the tech rep flew with him and found him talking into the back of his microphone! No wonder the tower reported him weak and garbled.

How's *your* mike technique? Do you speak directly into the business end of the thing? Or do you hold it nonchalantly off to one side while you talk? Some mikes should be held so close that they actually touch your lip, while others are not clear unless they are held about two inches away. Get on Unicom some day and find out what mike position gives the clearest transmission with your mike and your radio.

While we all think we know how to talk, some of us have developed habits of speech which are not noticeable in normal conversation, but make our radio transmissions sound like a mouthful of mush. Simple tip: listen to a good controller at work—study his speech habits, and imitate him. Did you ever hear a tower controller who didn't enunciate clearly?

If some of you are still using the old military T-17 gooseneck microphones, watch out for sticky mike buttons and poor quality because these are getting pretty ancient; might pay to carry a spare in the airplane.

If you still have one of those cute plastic covers over your mike, please take it off and give it to your wife to use for covering left-overs in the refrigerator. They may keep germs out of the microphone, but they also tend to keep sounds out. I'm sure your listeners want to hear what you have to say, even if your mike does catch a nasty cold.

Regards,

Nancy

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P.S. Got your FREE copy of "How to Fly Omni" yet? If not, just drop me a note and I'll be glad to send you yours.

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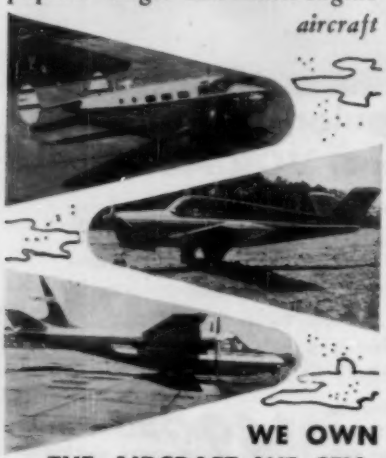

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And this super co-pilot weighs only 120 pounds and displaces only about 4.5 cubic feet. Truly, it is a fitting companion, even in a single-seated cockpit! END

(Continued from page 58)

couldn't afford to deviate, and passed over Treviso at 23,000 where I cut back to idle with ten gallons reading on the fuselage tank indicator. I wanted power as long as it would last. We needed our radio and electrical power for our instruments. I had to hold a 10 degree bank to maintain headings. At this point we were working okay with Charlie #1 which gave us the frequency for the Aviano Range Station. We tuned in and got a good compass swing. Right on the nose. This was a double check on headings given us to fly. They told us to try to make the Aviano Range Station at 5,000 feet. We hit it at 10,000,

As we started in to get a compass needle swing while on a zero degree heading, they gave us a hard right to 55 degrees. After the turn, I dumped dive flaps and started down. As they called out my remaining distance, I answered with our altitude. This gave us both a picture of our progress. Fuel remaining on the indicator had read zero for the last two minutes. I had turned on all fuel pumps and air start ignition switch. The battery wouldn't last long this way but we had only seconds to go. It was now or never.

Approaching the field, we were down to 2,300 and I leveled off, retracted the dive brakes and looked outside for the first time. We glimpsed lights below but couldn't tell what they were. Charlie #1 had just informed us that Aviano had about 800 feet and ground fog. Oh, brother! They now said we had just passed over the field and then they started to fade. Realizing that they could not help anymore, I turned the radio off but left on the interphone so I could talk with the Lieutenant in the rear. I made a 110-degree bank to the right and dived on the lights till I brought them through the canopy length at 12 o'clock high. Then they disappeared. I continued on down, holding the ship to where I thought the lights were dead ahead. We broke out, slightly below 400 feet and I saw the lights of the tower at 12 o'clock level. We went streaking past at tower level indicating 270 knots. Now, where was the runway? After passing the tower, it came up fast enough but we were heading across it 90 degrees from lined up and too fast to turn into it. We passed over and turned downwind parallel to it. If we could get enough runway behind us before slowing up to 150 knots, we could make our turn in and still make a wheels-up. I had time to think, so I checked everything in the cockpit and tried an airstart. This was silly, but it couldn't

(Continued on page 62)

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(Continued from page 60)

do much harm. We were almost parallel to the end of the runway and ready to turn in on base leg when I got a throttle response. I almost jumped out of my seat. Something was mighty queer but I wasn't going to argue. I used the power full and dumped everything: gear, flaps, dive-brakes. The turn was coming out good but we were coming in fast, so I cut the engine to idle. The windshield was solid ice and I had to sideslip to see the runway. Over the fence, we were still hot, so I cut the engine OFF. We just counted lights whizzing by but finally touched and I let the nose down and started toeing the brakes. Couldn't tell how much runway was left or whether or not there was a barrier. We knew nothing of the airfield other than that we were on it and braking to a stop.

We passed the crash crews and equipment and stopped about 1,000 feet beyond. As they came out and surrounded us, I turned on the radio again and tried calling the tower. I noticed the fuselage tank read 50 gallons, so I turned the fuel boosters back on and watched the tank promptly fill up to full. This told me our original trouble was a stuck float valve in the fuselage tank. I could have used the by-pass system and gone on to Rome to begin with!

The Base Commander had gone to the tower and now called us, asking if the crash equipment had arrived.

"They're here," I answered. "Can't you see them?"

He replied that the tower was now in the overcast. I looked around and sure enough, its lights were barely dim blobs. It was raining hard and the estimate was that we had touched down at about 100 feet and a mile visibility. Almost as bad as our take-off. I shut off all switches and we just sat there.

The Base Commander came out with the Flight Surgeon and we evaluated the situation. The conclusion: we must live right.

The following day I gave the aircraft a closer inspection. The only damage was a worn tire. It could be flown home. Weather was clearing, so I filed a clearance and departed for Hahn. En route I discovered why I had to fly 10 degrees right bank to hold a heading. The flight indicator was out and would show 20 degrees of bank while flying level.

What I have not heretofore mentioned is that Aviano lies at the base of the Alps. The next day I saw them, with the first mountain about three-quarters of a mile from the runway. It was 7,000 feet high and steep. If we had swung left instead of right on our turn back into the field just before diving, we would have hit the hill. The tower had been frantically calling us and instructing us to bail out on a heading of 120 degrees which was away from the mountains. Our radio was turned off and we hadn't heard!

I would like to praise the GCI station on their good work in splitting us right over the middle of the field. Though they couldn't do more, this was one of the keynotes of our experience. END

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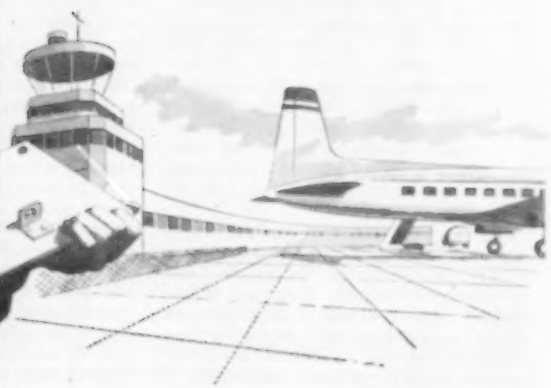

AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is "To make flying more useful, less expensive, safer and more fun."

Headquarters address is Box 5960, Washington 14, D. C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

AIRPORT PROBLEMS

Preservation of privately owned airports, eyed by real estate operators as potential housing or shopping center developments, is a crucial problem facing private flyers in many parts of the country, inquiries received by AOPA's airport consultant, C. C. Thompson, from AOPA members indicate.

Thompson placed this situation at the top of the five major types of problems connected with airports that his department is called upon to help solve.

Established landing fields frequently are in the path of urban developments, and one of two things usually happen: an offer is made for the property by someone who wants to make a real estate development out of it, or taxes are increased to the point where the landing field no longer can be operated profitably.

"When this problem arises, I usually advise the affected flyers or the airport owner to make an effort to get either the city or county to take the airport over as a community enterprise," Thompson said. "Officials of an increasing number of cities and counties are beginning to realize that adequate airplane landing facilities are essential to the proper development of a community."

How to get local officials interested in providing a public airport is the problem that ranks No. 2 on Thompson's list. AOPA'ers want to know how to form airport committees and how the committee can go about "selling" the airport idea to the officials of their community. The airport consultant usually is able to assist the inquirer with a variety of informational materials he and AOPA have assembled over the years.

Problem No. 3 concerns the financing of an airport, especially on the procedures to be followed in getting Federal-aid funds for municipal airports. Thompson is particularly well-qualified to help here; he played an important part in getting Congressional approval for Public Law 211 by amendment of the Airport Act in 1955. A related problem, No. 5 on Thompson's list, concerns obtaining Federal loans for construction of hangars. Specific information on the requirements of government agencies controlling these funds, and procedures to be followed in filing loan applications, are provided AOPA'ers by AOPA's airport department.

A difficult problem faced by some airport operators, who seek AOPA's assistance, is that of preventing construction of powerline hazards near the end of airport runways. Thompson classes this situation as airport problem No. 4. In many instances the airport would have to close if the public utility company went through with its plans. Means of meeting this threat vary considerably, but usually it boils down to a public relations job, Thompson pointed out. The power company must be convinced that neither its interests nor those of the community would be served if the city or county is deprived of aircraft landing facilities. Flyers using the threatened fields are more than willing to pitch in and help the operators save the landing strips or airports, the consultant said.

AOPA established the airport department in 1956 to assist in achieving expansion of the Federal-aid Airport Program to the point where a system of airports, as toll-free as the nation's public roads, will be provided users of the airspace.

High on AOPA's present airport program are two objectives: (1) enactment of legislation by Congress that will provide a 1960-70 airport plan and program designed to raise the number of "permanent" landing places in the nation's system of civil airports from 1,328 to 4,284; and (2) passage of uniform state legislation exempting from taxes all improvements on privately financed, public-use airports where the owner signs an assurance agreement to maintain and operate the airport as a public service facility.

The AOPA airport department is in continuous contact with all State and Federal agencies having any sort of civil airport planning, financing or regulatory responsibilities. It also serves as a clearinghouse for information important to the private owners of public-use airports and related base service operators. The department covers, or participates in, all Federal government activities relating to airports. Thompson is a member of the Industry Advisory Group of the Air Coordinating Committee's Airport Use Panel. He also participates in the activities of many of the aviation trade groups primarily concerned with airports.

"Cy" Thompson, as he is known to thousands in the industry, joined the AOPA staff in May, 1956, after serving as a part-time consultant to the Association for several years. Prior to his connection with AOPA, he acted as airport consultant to several national organizations, including the National Business Aircraft Association, American Municipal Association, and the Administrator of Civil Aeronautics. He also is a former vice president of the United Air Lines.

Thompson is editor of the AOPA Airport Letter, a weekly publication circulated in the airport operations field on a subscription basis.

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"As simple as a flight from Chicago to Washington" was the way an AOPA member described his flight to Europe in a Twin Beechcraft Super after enlisting the aid of AOPA's Flight and Travel department in planning the trip.

"The trip to Europe and the return were excellent, and we want to take this opportunity to give a great deal of credit for the success to you and to AOPA," Victor Heurlin, Jr., (AOPA 118423) chief pilot of the Thor Power Tool Co., Chicago, Ill., wrote the Flight and Travel Department. "The very vital information you so helpfully passed on to me, and the great assistance you were in the flight planning stages of the trip, simplified the flight to a point where it was almost as simple as a flight from Chicago to Washington."

AOPA'er Heurlin was pleased particularly with AOPA's advice regarding the documents he would need on the flights to and from Europe.

"Your recommendations on credit cards and Customs Carnets surely saved many hours of hardship as we visited some twenty-odd countries on our trip," he said. "We were very fortunate in not having one extra moment's delay with any of the additional red tape normally associated with clearing private aircraft.

"This was my first direct contact with AOPA even though I have been a member for about five years. I can say I am very happy to be a member of such an active aviation group," Heurlin added.

Cyril C. Thompson, AOPA's Airport Consultant

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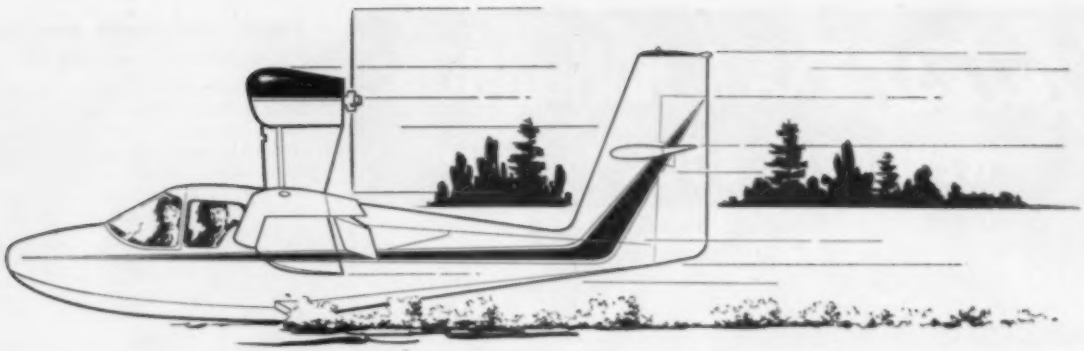
Is Fear of Flying Normal?

(Continued from page 37)

out that, while the subjects of his evaluation were pilots and navigators, passengers and other crew members pass through each stage as passive counterparts. Thus, the value of his report to aviation as a whole is manifold.

To aviation medicine it provides, ". . . a rational approach to the emotional problems of flight." To the field of commercial air transportation, on the threshold of the jet age, it provides a sound basis for a passenger education program which will insure the orderly progression of a large portion of the traveling public through the first two stages into the desired third stage. Of vast significance is its value to flying safety. If, through a better understanding of the emotional forces affecting them, it aids pilots to shorten their transition through that accident-prone intermediate stage, when confidence exceeds competence, the value of Doctor Tempereau's work will be monumental. END



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Once its wheels touch the runway, or its hull brushes the water, the Tach IV is *in*. All you need to do is to guide it "home" and cut the power.

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LA GUARDIA AIRPORT
FLUSHING 71, NEW YORK

North and North and North

(Continued from page 23)

at my destination. I knew where I was going a little better than this indicates, but I'm trying not to drop too many clues. I think the sand strip would not be called an "airport" on any sectional but, if I had found it overgrown or otherwise hazardous, I had enough gas to reach an alternate.

Perhaps no other airstrip ever came into being quite as this one. Not in peacetime. The small daughter of a mine official was strangling one autumn night almost ten years ago. Some obstacle had become stuck in her windpipe and her throat was fast swelling shut. The mine radio contacted Dr. Gordon Bell in Sioux Lookout, but there was no way for him to get into the bush for the necessary tracheotomy. By snowshoe or dogsled, he was days away. The slush ice was too soft for skis and too hard for floats. And there was no airstrip for a landplane.

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Dr. Bell landed at daybreak. The stricken child was saved. Subsequently, the emergency strip afforded an exit for mine officials and engineering equipment as the company pulled out. But that lonely clearing remains a monument to the bare-handed men who, one night in the copper-colored past of the north country, clawed a miracle from the muskeg.

Now that strip was my destination. Under the Apache's wings, the afternoon sunlight reflected from a thousand mirror-like lakes that first dot the landscape, then monopolize it. The timber became thicker and shorter. The extreme cold that keeps the trees small seems to bunch them close to keep them warm. Red pine, balsam, cedar, Norway spruce. Over them I kept going mostly north. Soon there is almost more water than trees below. The land of lakes becomes almost a lake of islands. With my mine company chart and the most careful scrutiny of the shapes of these water bodies, I picked my way toward Hudson Bay. Out of reach of all radio aids now, no sign of civilization in any direction, I kept going. If I don't go fishing often, when I go, I go.

I found the sand strip in the wilderness, dragged it, picked the least rough spot, and landed. What a fantastic world! At lunch time I had been shopping at Marshall Field in Chicago. Dinner time the some day, I was standing outside a Hudson's Bay Trading Post in a land populated only by bear, caribou, moose, Ojibway Indians and an occasional prospector. In half of one day from the bubbling fountains of a Loop office building in Chicago to sipping water from a lake so filled with fish that a hungry Indian boy will merely lie beside the shallows and flip them up onto the bank with his hand.

In that birch and spruce and pine wonderland, in the uncontaminated oxygen of the land beyond, where the nights are

(Continued on page 70)

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(Continued from page 68)

only three hours long, I spent two unforgettable days.

There are no trails through this bush. No portages cleared or cut out between lakes. There are three ways to travel: afoot, by canoe (which must be carried between lakes), or by dogsled during the long months when the Northland is buried alive. At the trading post, a good sled dog is worth a white fox fur in the autumn, but not worth a weasel in the spring when his ravenous appetite must be fed through the months ahead. It balances out, as does everything up here. But a sick dog or a torn canoe or tired feet can be disastrous.

There are two great tragedies of the north. To be caught without transportation is one of them. I thought of the safety of the aircraft which I had secured only with huge rocks for wheel chocks and knew my first small feeling of panic. I was due for more.

Then there is fire, the forest's prime evil. I saw some of its hideous scars across the landscape en route, none after I had arrived. Aside from these greater tragedies, there is one smaller. The black fly. This is the pest of the north country. The farther you go into the muskeg, the worse they are. These tiny insects will drive animals from the woods to stand neck deep in the water until nightfall. White men have been known to lose their minds due to the exquisite torture of fly season. In a land that's 60 or so below from freeze-up to break-up, too cold for snakes or almost anything, the Good Lord put the black flies so we'd know his ultimate paradise is elsewhere. But they will not bother you indoors or on the lake at night. You adapt yourself to their habits and settle into a pattern of coexistence.

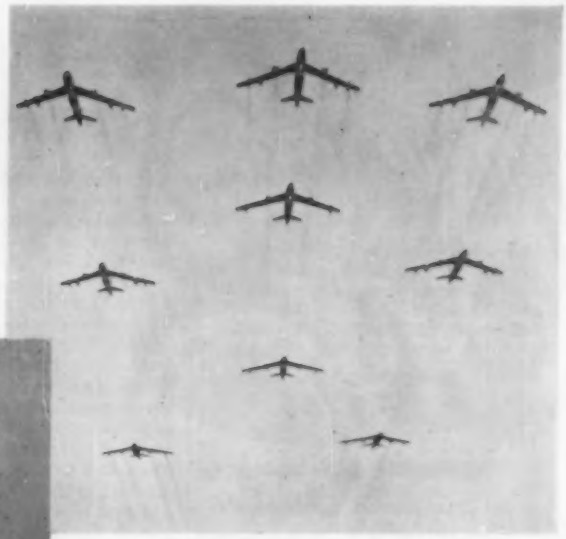
Any foreigner feels himself an intruder in the presence of a strange language. I wanted to know something of the Ojibway (pronounced Jib'wa) Indians about whom so little history has been written; but it was no use. Certainly not in two days, and I think not in two years could I ever learn to make sense out of the confusion of grunts, groans, wails and hisses that makes up the language of the Ojibway.

I learned to say "Bijou" which, like the Hawaiian "aloha," means both hello and good-bye, depending upon whether you're coming or going. "Meg-wich" means thank you, and, with these, I managed to make out. The Indians are not communicative. They are peripatetic primitives. We can't figure them out because there is nothing to figure out. The Ojibway is an uncomplicated forest creature who genuinely wants for nothing except to be left alone. He is constantly in hock to the "Bay Company." But the Hudson's Bay Company built itself and flourished on confidence in the future, so the Indian borrows on next season's fur and the prospector is grubstaked on a hoped-for strike. Some default. But, as I say, everything balances out.

Take the massive, stagnant stillness before an afternoon storm. It hits suddenly with fury. Its turbulence, without obsta-

(Continued on page 72)

Ready for a flying start



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(Continued from page 70)

cles to deflect it, is a terrifying thing. Across the low, level landscape it roars. The short pines desperately dig their roots into the rocks struggling to retain their precarious footing. Some can't. The lake of unruffled blue shimmering in the sun, suddenly turns a gangrenous green and rises and falls with such violence that the Indian has long since learned, wherever he paddles his birchbark canoe, to follow the shore line. To the tenderfoot it seems the long way 'round, until he sees the merciless fury of one of those afternoon storms. A man, soul-less in this environment, would be a very little thing. Finally, about midnight, the north country sun begins to set. The green turns to red and gold and purple and into breathless, starlit night. Torrents of silence pour in from all sides. Then it is that this land, with the unretouched beauty of youth—with sunshine and crystal clear water her only cosmetics—sleeps. Everything balances out.

Dawn brings the soft tinkling of waves against the skim of shore ice. The northland comes alive to music. The birds waken. There is no underbrush in the forests of lean trees but underfoot the moss carpet is sponge-like, inches deep. The Indians use dried reindeer moss for everything, for burning up, lying on, chinking with, eating off, and for disposable diapers.

I won't relay any fish stories. You wouldn't believe them anyway. It's a waste of weight to carry the fancy glass rod with goldplated guides and the Supreme reel with varicolored tapered line and a hundred lures when Wall Eyes and Northerns will strike at an old rag or a piece of bent tin or a naked hook on almost every cast. But what would fishing be without fancy equipment? Speaking of fancy equipment—noon Sunday was the appointed hour of departure. I was ready for a warm bath but genuinely reluctant to leave. That is, I thought I didn't want to leave until, suddenly, I couldn't!

My pretty, coral-colored flying machine was intact where I had left it. But the starboard engine wouldn't start! Only an airman can fully appreciate that "sentence." The Apache was unmoved, unmolested but unyielding. And a long way from the nearest A. & E. When I ran up the port engine to cut in the generator at 1,200 rpm, the starter spun the other prop at a respectable speed, but it would not take hold. Suddenly anxious, I pumped the primer. Not a wheeze or a burn or a cough. Nothing. The sandy strip made a single-engine take off impossible even if I were brave—which I am not.

I knew the Canadian Mounted Police could follow my flight plan and eventually find the plane in that clearing. But I was convinced that any prolonged absence from my duties back home, already neglected for two AWOL days—and the world would stop revolving. I kept trying the right engine. With long minutes between tries, to let the battery recharge. It seemed like hours. I was unashamedly anxious now. I peeked at the plugs. They were not wet. I tried the starter again. Eventually, and with all cylinders, it took hold. I don't yet know what was the matter. Moisture? Condensation? I suspect the extra strokes with the primer were premature, had flooded it. I'm not sure. I made a careful run-up and took off—headed south.

This time I radioed Graham to alert Customs for my arrival in Port William. At Lakehead (Port William) I filed a flight plan for Chicago. Point of Defense Zone penetration was five minutes after take-off. I double-checked this aloft and alerted Chicago Customs. I flew non-stop Port William to Chicago, terminated the flight and cleared Customs at Midway. The cost is pro-rated among aircraft crossing over the border each calendar day. It can be $45, may be as little as $6 or $7 per aircraft.

Back at the office I discovered to my slight chagrin that, even in my absence, the world had somehow gone round and round just the same. Perhaps it can spare me again some weekend.

As the planet shrinks under the whirr of man-made wings, more of us will invade this last frontier. And one day the game and the game fish will make a last stand in this final retreat. And the simple Ojibway Indians, step-brothers of the Cree, will be introduced to our frantic ways and foolishness and fire and firewater and loud laughter and littered streets and lined faces. And great chimneys will belch soot across this last, lost horizon.

But not for a little while. Because I haven't told where I went. END

"The Ojibway is an uncomplicated forest creature who genuinely wants for nothing . . ."

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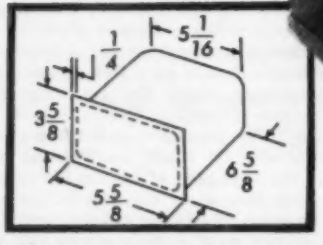

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A Better Way of Life

(Continued from page 27)

waters around the island searching for the answer to their distress. Well out toward the Gulf of Georgia, he made out the figure of a man sprawled face down on a floating log, arms and legs trailing in the sea, and drifting north with the tide. Off to the south, he saw a brisk wind was pushing a derelict boat in the opposite direction. Obviously, the drowning man, inexperienced with boats, had failed to pull his craft high enough on Clark Island to escape the rising tide; subsequently, he had seen it drifting away and had attempted to paddle after it on a driftwood log.

Banking low over the water, Schoen dropped his Mae West literally on the exhausted man's shoulders and flew in search of the nearest powered vessel. Locating a fishing boat, he dropped on deck a weighted carton bearing the brief note: "Follow me—man lost at sea."

In the twilight, Schoen led the boat to the man, then, following his rescue, to the man's drifting boat, and finally guided both boats to the marooned woman and children on Clark Island. When he was certain that all was well in hand and the endangered family safely united, he waggled his wings in farewell and continued on his route.

Though the Mae West was stamped with the name and address of the company, no word ever came from the rescued family—nor was the life jacket ever returned. Ah, well.

Island Sky Ferries is not licensed to fly passengers after nightfall, as island airfields are little more than clear pastures lacking facilities for night landing. This does not hinder "mercy flights." They have been an adamant policy of the company since its start. The San Juan Island's physician, Dr. Malcolm G. Heath, himself a pilot, understands the hazards of taking off or landing at night from an unlighted meadow, its mud ruts perhaps frozen in deep corrugations. But when the doctor phones about an emergency, Roy answers, "If you say the patient has to go, that's it."

Medical emergencies, which have a way of happening after dark, finally led to misunderstanding with the Civil Aeronautics Administration. Roy was warned that if he flew passengers again at night, without proper facilities for night operation, his license would be lifted. Explanation of his responsibility as the islands' emergency transportation bore no weight. One bitter night, Roy flew in with a desperately injured man who had taken the blast of a shotgun full in the face, taxiing his plane to the very feet of a CAA inspector making a check of Bellingham Airport.

"All right, Franklin. You've done it for the last time. This is it. We've warned you but you've continued to have your own way."

"Here, give me a hand unloading this poor guy," Roy countered.

The inspector did and then and there they reached an agreement. Roy was to continue to use, respectively, Dr. Heath's and his own judgment of medical emergencies and flight conditions. However, he was to file a full report to CAA of the need and circumstances of each odd-ball flight immediately on its completion. Recent construction of fine medical centers at Friday Harbor and Eastsound, and expansion of island medical services through the efforts of Dr. Heath, have eased the pressure.

Notes dropped pin-point from the gay-painted Stinsons have stimulated a legend of "Roy's Notes." The teacher of Waldron's one-room primary school once phoned Island Sky Ferries that she was delayed in Everett and would not be able to open school at the customary time on Monday morning. Would Roy please drop a note in the school yard dismissing the pupils for a half day? Plersed with the thought of giving the children an unexpected holiday, Roy wrote a facetious message of dismissal that scattered the children to the far ends of Waldron. It required two days to round up the holiday-minded children and restore classes.

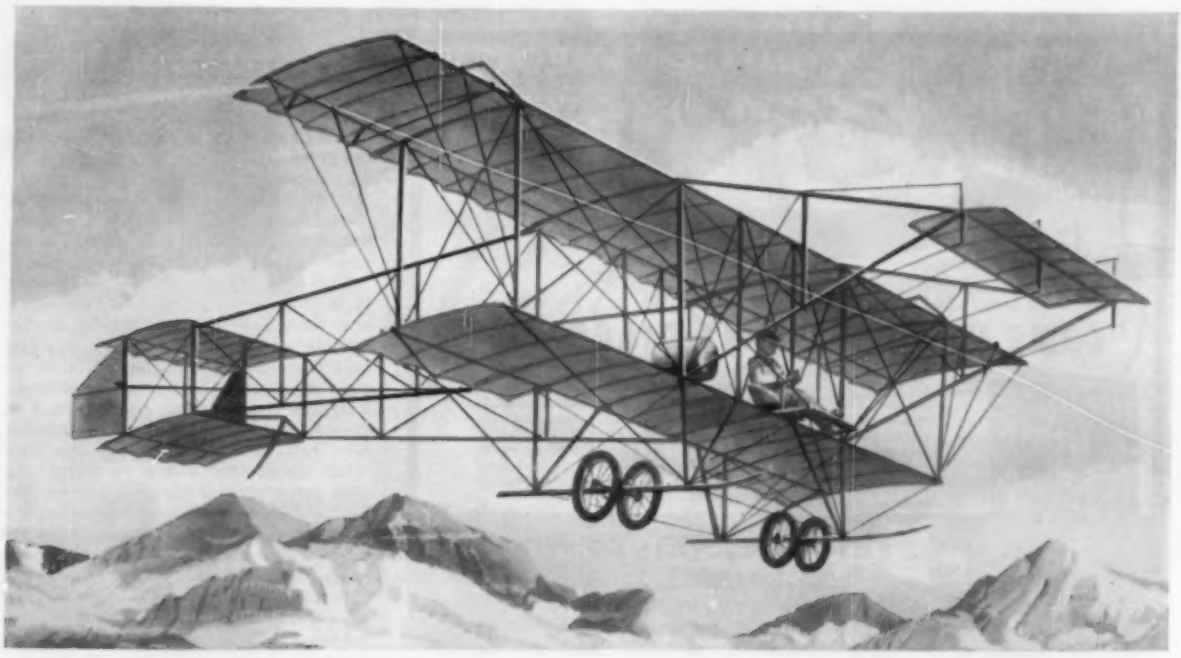
Roy's notes are wound around a rock, which in turn is attached to a bright-colored rag. One of them reposes on a Boston, Mass., mantelpiece, a conversation-piece in the home of a Waldron visitor who explains to her eastern guests, "That's the way they communicate out on the northwest frontier."

This particular note, announcing the birth of the first grandchild of Mr. and Mrs. Irving French, was dictated to Franklin over the phone by the young father and dropped from the sky into the French cabin yard. The Waldron Island colony in particular, remote from ferry routes, without telephone or radio communications, and too exposed to winter storms for safe anchorage some six months of the year, is dependent on the paternal thoughtfulness of Herb and Roy. It is hoped that government communication officials some day will allow the setting up of a two-way radio system between a center such as Friday Harbor and isolated settlements in the islands. Until that time, the people remain dependent on the sharp watch of ferry boat captains, fish boat crews and plane pilots.

The personalized service of Sky Ferries is best indicated by a look at some of its passengers. Capt. Jim Lovering of the Olympic Steamship Company is a "regular." The captain spends the maximum time with his family on Waldron Island by the expedient of having his company phone Roy when his ship is loaded for departure. Roy then drops a note in the Lovering yard on his morning run, picks up the captain in the afternoon and lifts him on his way to San Francisco or Seattle and his waiting steamer. Island newlyweds, bent on mainland honeymoon trips, "plant" their cars at Bellingham Airport a day ahead of time, and fly off with Herb or Roy.

Islanders board the planes as casually as they would a corner bus. Sheep ranchers' wives get "gussied up" for a day in town, fly over in the morning for a taste of city life and return in the afternoon with facials, new hair-do's and what not. Superior Court Judge Hobart S. Dawson is

(Continued on page 76)



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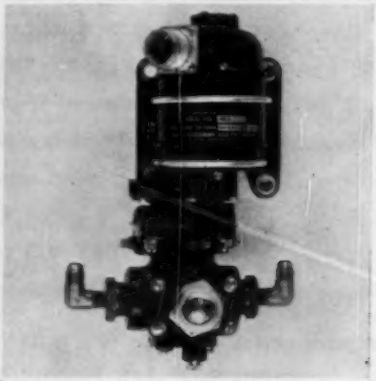

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(Continued from page 74)

a passenger each month, when he holds court at Friday Harbor, San Juan County seat. The judge, and the attorneys appearing before his court, recently earned the gratitude of Island Sky Ferries when they helped dig the big Stinson out of a soft spot after a beach landing at Waldron Island. The distinguished company moved sand with a will, freeing the heavy plane in a race with the incoming tide.

The sky ferry has flown, simultaneously, a 97-year-old man, V. W. Talbot, at one time principal of Friday Harbor schools, and a two-months-old baby girl, both traveling solo. On this occasion, the baby's young mother had planned to deliver the infant from Orcas Island to friends waiting at Bellingham Airport, who had agreed to care for the child while the mother took a necessary trip. The plane proved too crowded to take on more than the ten-pound baby, who slept through the 12-minute flight in the lap of a stranger and was passed on without a hitch.

Lists of errands in the pockets of Vaniman and Franklin give insight to the usefulness of the airline. On practically any flight, the pilots will make nine or ten separate shopping stops. Typical of the tasks entrusted to them are the picking up of false teeth, eyeglasses, pets headed for veterinary hospitals, the matching of ribbon or yard goods, the purchase of groceries, plumbing supplies, boating accessories, baby chicks from hatcheries, and even a wedding dress.

Livestock is frequently and often unwillingly ferried, encroaching on the dignity of the airline. Once a 32-pound tom turkey provided the fun. Otto Mittelstadt of Seattle, who raises Aberdeen Angus beef on an Orcas Island ranch, was stocking his ranch with turkeys and the big Stinson had a load of hen turkeys, peacocks and peahens and the massive "tom." When all were loaded, in crates, no room could be found for the big tom's crate. Mittelstadt decided his lap was the place for the turkey. He bound the indignant cock in a sack from which the head protruded. Airborne, the turkey was flattened each time it was necessary to pull back the dual wheel of the plane. The flight proceeded across the sky with startling sound effects, and gobbled its way down to Eastsound Airport.

Delighted travelers were five purebred, half-grown Springer Spaniel pups en route to San Dwan Kennels at Mitchell Bay, San Juan Island. Cmdr. Delancey Nichols, kennel owner, charters Island Sky Ferries to pick up his fine animals on the last lap of their long air journeys. On this occasion, the dogs arrived in large aluminum traveling crates too unwieldy to fit into the plane. Franklin solved the problem by turning the dogs into his cabin and crawling in amongst them to wait for take-off instructions from the tower of Seattle-Tacoma Airport. The puppies, overjoyed at release from restraint, bounded in gay abandon, pausing enroute to deliver moist canine kisses on the cheeks of their new-found friend.

Over the radio, from the sanctity of

(Continued on page 78)

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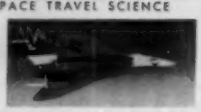

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TANKS FOR THE FIRES

To fight brush fires in 400,000 square miles of northern Ontario, the Dept. of Lands & Forests patrols with 40 DH Beavers & five Otters. A new wrinkle in dousing fire is the self-filling water tanks from which an Otter can put on a forest blaze 1,800 gallons per hour scooped from a nearby lake. Tanks are also in design for the Beavers. All smaller fires can be quenched thus and many larger ones kept in check. One-quarter of northern Ontario is lake surface, so little forest land is far from a water supply. The fire-fighting pilot simply lands momentarily, opens his tank valves, taxis a few feet to scoop the tanks full, closes the valves, flies to the fire, opens his valves again and, presto!

(Continued from page 76)

the airport tower, came the laconic question, "Are them dogs house-broke?"

Island Sky Ferries' summer schedule, packed tight with hundreds of tourists who take the flight for one of the world's most magnificent views, Seattle yachtsmen who commute back and forth to business from pleasure craft snugged down in island coves, vacationers, island hoppers, picnickers and campers, is further complicated by an annual contract with Mount Baker National Forest.

Franklin flies fire patrol when summoned after lightning storms in the mountains, and drops cargo to fire fighters and forest workers. Forest rangers conduct aerial surveys deep over inaccessible territory with the boon of his wings. In the high country, too, his talent for spotting individuals in distress is depended upon. He may search for lost prospectors, mountain climbers, hunters or high lake fishermen.

But it all gets done in the long flying days of summer. The work load never seems so light, nor the life so fine, as on those days when a "prescription passenger" is waiting at Bellingham Airport. These particular passengers are always flown to altitude for the full, breath-taking panorama of sunken mountain tops and inland seas. They are there on doctor's orders to spend an hour feasting on the beauty of the islands. "Good mental therapy" is the doctor's phrase for perspective gained from viewing this wondrous geography.

Herb and Roy know, from advice of the physician, that each of these passengers is a harried young mother taking a rare day off from a life too filled with work and care. For her they fly high and wide over a fairyland of sparkling waters and wooded mountains. And to all of us up here indeed Island Sky Ferries is "good mental therapy." It has brought us a better life. END

Magnetometer Pilot

(Continued from page 50)

going to work. Rivers, patches of trees, sandbars, protruding rocks or even the smallest ponds make references on which to line up. Our reflights because of faulty navigation should run less than 10 per cent and on one job in Virginia, I had to refly only five miles on a 1,034-mile job. It's much easier to fly a magnetometer survey, or for that matter, a mapping flight, if there is a slight wind blowing. If flight lines can be planned with a crosswind, the plane has some angle of crab and it is possible to see around that big radial engine. Flight lines over a suspected mineral deposit, however, should be flown perpendicular to the supposed body of ore. This wind drift advantage is hard to come by. Geophysical mapping perpendicular to bodies of ore also puts you perpendicular to most ridges and results in a roller coaster flight pattern.

I get lost many times on flight lines. By lost I mean that I'm one-eighth of a mile off course and the results are unsatisfactory. The maps, of course, are not reliable and even aerial photographs taken as an uncontrolled mosaic will give considerable confusion. In one area of the Appalachians near Utica, N. Y., we surveyed for a possible iron deposit. The country was mostly tall fir trees and the only maps available were prepared by a doctor of medicine in 1880. Navigating that job was a headache! There's no average magnetometer job.

We operate all our exploration aircraft on a "restricted" basis and take off in the Cessna 195 at 430 pounds over full gross. Actually we can operate up to the float plane weight but if anything happens, it's the pilot's fault. Our latest magnetometer gear has been cut down to only 60 pounds so that we can start out with a full 120 gallons of fuel aboard. That gives us six hours at cruise, but the time is considerably shorter in mountainous full throttle flying.

Mechanical training isn't absolutely necessary for flying of this type but it certainly helps. The nine months I spent studying aircraft and engine mechanics at the close of World War II have been a great help. We carry a spare fuel pump, vacuum, points and plugs and handle all our routine maintenance. Evidence of the roughness of flight operations is visible each time one of our magnetometer airplanes comes home from a trip. One Cessna 195 came back from Alaska recently with the stabilizer beaten up from flying gravel. The "airport" was a sand bar.

Actually, the nagnetometer operator is better off in case of a crash than the pilot. As long as the electronic equipment doesn't come unglued, he shouldn't have too much trouble. We've "beefed up" the engine mounts for the "985" so that I believe it would stay out of the front cockpit and at the same time clean out quite a hole in the brush for the fuselage to follow.

Hazardous? Perhaps, but I've logged over 7,500 hours since 1940. And the more of it I do, the better I like it. END

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(Continued from page 29)

cedures which failed to eliminate the earlier learning, or which failed to superimpose the new learned pattern to a stable degree. (And why, by the way, were two such controls transposed?)

Take the pilot who flew his executive transport into the ground while the gyro-horizon indicator read "nose-up." On the surface, this seems an unforgivable pilot error. It's obvious he didn't really look at the indicator. Or did he? Again we are confronted with an area in which human limitations loom large. There is a definite limit to the amount of information the human brain can absorb and digest in a given time. This limit varies from person to person but seems to fall below even the high capacity demanded of the birdman.

Every time an instrument is added to the panel, we both increase the probability of error and slow response time, for both are a function of the size of the selection field. No human could hope to adequately cover each and every instrument which we manage to cram into modern aircraft. The pilot is assailed by myriads of instruments which variously require quantitative readings, qualitative readings, check readings, and tracking or setting, not to mention the mental acrobatics imposed by interpolation requirements. When the executive pilot goofed, we might better have looked at the job we gave him to do. Can we fairly say it was the pilot's fault that he failed to extract the total information being thrown at him through a multiplicity of instruments, even when this was patently impossible? Or should we do something concrete about eliminating unnecessary information bearers and by simplifying those remaining? Why not give the pilot only what he has to know in terms of what he can use without interpolation?

We have evolved a number of criteria for "good display." According to "the book," an instrument panel passes muster if it presents easily visualized data, can be read quickly, and can be read as accurately as necessary in the time allowed. But is this sufficient during stress or emergency? Remember, the pilot is no longer operating at his old, cool self. He's revved up, variable, open to error, subject to reflex, and all at once confronted with a multiplicity of tasks. Now how does the instrument panel look?

That takes us to the pilot who bailed out while in straight and level flight. A few years ago the word "illusion" was one for the psych books. But suddenly we're batting against it. Every time we produce a faster, higher-flying aircraft we step deeper into the aerial quagmire of "mistaken perception."

Man operates by information supplied by his sensory organs. All decision and response depend upon the accuracy of input data, or the interpretation of the data. Aside from the proverbial five senses, there are at least three others basic to aerial orientation: two in the inner ear and pressure senses distributed throughout the muscles, joints, skin, and internal organs. Their basic job is to place man's attitude relative to his environment. Unfortunately, they were not designed for sudden accelerations or radial flight. A pilot spinning to the left may sense himself turning to the right; a sudden positive acceleration may feel like climb, negative acceleration like a dive; a pilot in a vertical dive may sense he's in straight and level flight. Unintentional inverted flight isn't at all a rarity.

Read the instruments, did you say? Yes, this is about the best we can say. However, elaborate visual illusions also accompany sudden accelerations, tight turns, blind flying, or conditions in which the usual visual cues are absent. The eyeballs may move in slow sweeps with rapid "snap-backs" (nystagmus); visual objects may seem to move in random fashion (autokinesis); lights may appear to split asunder. These are only a few of the numerous vertigo responses which are becoming more prevalent as aircraft designs advance. This is why the pilot ejected while in straight and level flight. Sure, he was straight and level—but he didn't know it and, under the circumstances, probably had no way of knowing it. Ever try to read a dial while your head's swimming? The pilot probably thought that he was going straight in—had to make what he believed was a life-and-death decision in split-second time.

"Vertigo"

Pilots (especially jet fighters) should receive concentrated vertigo instructions and demonstrations as an integral part of their basic training. They should be subjected to rotating chair and centrifuge devices. They should know the danger in shifting sight between instrument panel and the exterior visual field when the latter is poorly structured. They should be taught not to make sudden head movements, not to fixate instruments, and to depend upon their instruments when their body senses are in disagreement. In short, pilot error involving vertigo may represent weaknesses in our training methods.

Some aircraft accidents result from the pilot's inability to respond quickly enough to an emergency situation. Such accidents should increase with increased performance, but we should not label them pilot error. After a visual stimulus strikes the eye, it requires somewhere in the neighborhood of 30 milliseconds to reach the brain. More time is required for recognition, integration, and decision, and more time yet for response. Then there is a final time lag before the aircraft responds

(Continued on page 82)

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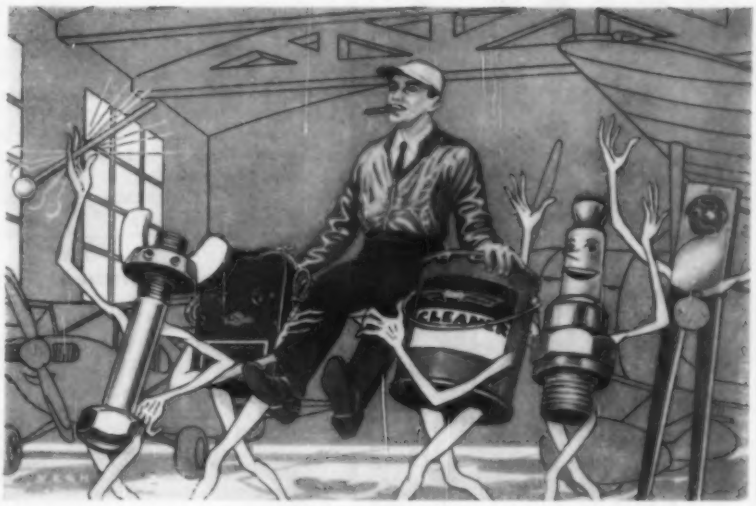

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(Continued from page 80)

to the changed controls. All of this means that an aircraft, especially a jet, may move hundreds of feet between the pilot's first visual awareness and his ability to affect aircraft performance. This baby shouldn't be left on the pilot's doorstep. Proximity warning devices may be one answer. Or means whereby the pilot is fed anticipatory information.

These are not the only influences to pilot error. Fatigue, lack of familiarity with route, equipment or procedure, "overload" or insufficient work load (thus tending toward preoccupation) are others. The roll call is long. But if we abandon the weird thesis that human capacity equals machine capacity, we will have made a long forward step. If we incorporate fully what we now know into the design of instruments, controls and personal gear, a longer step will have been made. Finally, if we improve and expand our training programs, and "know that the pilot knows" before he climbs into the tall blue, we will have made a giant step. Then watch pilot error statistics. I think we could predict a sharp drop. END

Piper Comanche

(Continued from page 36)

aluminum construction throughout and all metal parts are zinc chromated on both sides. The wing structure is made up of a deep main spar supplemented by a rear and front spar. The main spars are joined together with high strength butt fittings in the center of the fuselage, making, in effect, a continuous main spar. Since the maximum thickness of the wing is 40 per cent aft of the leading edge, the main spar passes through the cabin under the rear seat, providing unobstructed leg room for passengers. The structures are built to withstand a maximum load factor of 7.5, as compared to the CAA requirement of 5.7.

Aerodynamic features: The design of the Comanche embodies a number of interesting aerodynamic features which contribute to its high performance with relatively low horsepower. It flies on a laminar flow wing, a design where the thickest point of the wing is farther back from the leading edge than most wings. It has the advantage of providing enough lift to sustain flight with a low angle of attack in cruising attitude, which reduces drag and results in more speed.

To reduce the size of the horizontal control surfaces and provide better controllability in all speed ranges, a "flying tail" or stabilator has been incorporated. This stabilator consists of a single-piece horizontal surface hinged at approximately 30 per cent of mean chord. It moves in its entirety when the control wheel is moved fore and aft. Use of the stabilator results in a reduction of approximately 20 per cent in area with resultant savings in weight and drag.

Before returning to the flight line, I chatted with Assistant General Sales Manager Wally Smith about price and delivery on the plane. Smith said the Custom Comanche will sell for $16,100 and the Super Custom for $17,600. Production is presently two units per week, and after the first of the year, one unit per day with a progressive increase.

In checking power settings against true airspeed at 7,500 feet where the outside air temperature was 35° F, we came up with the following.

% Power	H.P.	RPM	Manifold Pressure	GPH	Indicated Airspeed	True Airspeed
75	135	2,400	22"	10	143	161
65	117	2,100	22½"	8.8	133	146
55	99	2,000	21½"	7.5	128	144

With such fuel economy, it figures roughly that (considering no wind) with 60 gallons aboard and flown at 7,500 feet under conditions of the check, the maximum range of the Comanche would be:

At 75% power..... 942 miles
" 65% " .....1013 "
" 55% " .....1152 "

It was twilight when we landed again at Williamsport. In the relatively short time I had spent in the Comanche, I felt "right at home." There is nothing confusing about the airplane; its performance is outstanding; its lines and styling are appealing. In my book it adds up to an airplane that undoubtedly will find its mark in business aviation. END

1958 PIPER COMANCHE

Manufacturer's Specifications

Engine	Lycoming 0-360 A1A
HP and RPM	180 & 2,700
Fuel Octane	91
Gross weight	2,550 lbs.
Empty weight (standard)	1,475 lbs.
Useful load	1,075 lbs.
Wing span	36 ft.
Wing area	178 sq. ft.
Length	24.7 ft.
Height	7.3 ft.
Wing loading	14.3 lbs./sq. ft.
Top speed (mph)	167
Cruising speed (75% power at 8,000 ft., mph)	160
Cruising range (75% at 8,000 ft.)	6.2 hrs., 920 mi.
Stalling speed (flaps down, mph)	58
Take-off run	750 ft.
Best rate of climb speed, mph	96
Rate of climb	910 fpm.
Service ceiling	18,500 ft.
Absolute ceiling	21,000 ft.

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What's with Winter

(Continued from page 45)

save him from being weathered in by a cold front. The same pilot, planning a route parallel to a region of lowering visibilities and low stratus, would think twice about such a course. Although the route would be marginal VFR at take-off, it could rapidly deteriorate as the oncoming warm front engulfed it. A flight away from the area, however, should lead to better weather.

Temperature, and its relation to dew point, can give advance warning of fog when other signs of its imminence are not evident. A spread of three degrees between temperature and dew point is a pretty sure sign that fog is on the way. It's a good idea to check previous sequence reports for temperature-dew point trend. A spread narrowing from six to five, to four, say, in the last three hours, should be a big, bright, red stop sign to a pilot anxious to go VFR.

Temperature, too, is a tip-off about fronts and their location. In the absence of a weather map, one's knowledge of the geographical location of reporting stations can be applied. Stations behind an advancing cold front will naturally be colder than those ahead of it. By noting the points at which the temperature becomes noticeably higher, the approximate line of a front can be judged. Cold fronts move faster, as a rule, than warm. Remember that a sequence is history even before it is sent. By the time you receive it, more time has elapsed. Nevertheless, it is the best information you can get. Qualify it, and use it.

Use your head, as well. When you have weather maps, but no meteorologist on duty, you can estimate the speed of a front from its successive positions on preceding maps. Knowing your own predicted ground speed, then, and the ground speed of the front, you can readily determine whether you or the front will reach your destination first.

Temperature has much to do with icing but needs its partner, moisture. Clouds are made up of water drops about 0.01 millimeters in diameter. These drops, in stratus clouds, tend to form rime ice on any surface when the temperature is below freezing. In cumulus clouds, water drops are often larger. Cumulus clouds too are turbulent. An updraft of 16 knots will sustain a droplet 5 mm in diameter. Your wing edge, smacking into large droplets of low temperature, becomes covered with clear ice, heavier by volume and harder to shed than rime ice.

Neither clear nor rime ice need scare you if, in winter or summer, you stay clear of cloud. If you own an instrument ticket and bore through, there is still no cause for alarm—*if* you can choose one or more certain alternative courses: (1) Fly at an altitude where the temperature will be either too cold, or too warm, for ice to form. A good thumb rule is to avoid the region from + 5 to − 15 degrees centigrade. (About + 40 to + 5 F.) Airflow over a wing cools the flowing air below the surrounding temperature.

(2) Use deicers (some light planes do have 'em).

(3) With or without either or both of the aforesaid two alternatives, always use carburetor and pitot heat. The temperature drop within a carburetor occurs for the same reason it occurs across an airfoil, and the drop is greater. Remember the partners-in-crime, moisture and temperature-drop. Their collusion produces ice. But caution: too much carburetor heat can cause detonation and loss of power. Watch your carburetor air temperature closely, especially when adding

(Continued on page 85)

"Fly to Cuba in leetle airplane . . ."

(Continued from page 84)

power, as in a climb. Set your limits, and stay within them.

Two final tips on ice: I. While wing, prop, and fuselage ice normally form only when visible moisture is present, carburetor and pitot tube ice may form without warning. Be aware of atmospheric conditions, and use carburetor and pitot heat when in doubt. Calculate your temperature at planned cruising altitude by subtracting from the surface temperature three degrees F. for every 1,000 feet of altitude. Example: Surface temperature is 46 degrees. You plan to cruise at 6,000 feet. Six times three equals 18; 46 minus 18 equals 28 degrees F., well within the icing area. Plan to use heat, especially if the air is hazy.

II. Beware of the Seven Critical Icing Areas: (1) Wing leading edges. (2) Propellers. (3) Pitot tube. (4) Carburetor. (5) Antennae. (6) Windshield. (7) Fuselage and wing surfaces (more prevalent on the ground in ice, snow or freezing rain).

Fog, while perhaps no more frequent in winter than in summer, can be more spectacular in its effect on the unwary pilot than many other types of weather, usually because it forces him into an emergency situation. If you recognize conditions conducive to fog, you will be forewarned and prepare accordingly. The best devices for combating it are an ample supply of gas and a flight plan for an alternate airport. To know when to use these devices, many fog signals are available besides the temperature type already mentioned.

To recognize such signals, some knowledge of the nature of fog is necessary. Fog is simply a cloud at the earth's surface. Two types prevail, air mass fog, and frontal fog. Physically they are the same, differing only in origin. Air mass fog is either advection fog, formed by warm air cooled to its dew point by flow over a cold surface, or radiation fog, formed when warm air loses its heat by radiation upwards, causing cooling to the dew point. Advection fogs occur over land or water, radiation fogs over land. In general, the following conditions are air mass fog probability indicators: clear, cool nights with light winds, moisture in the air at lower levels, and of course, the narrow spread.

Frontal fog is generally associated with the warm front, and is caused by rain falling from warm into cold air beneath. Cold front fogs are usually narrow in extent and precede the front. Warm front fogs are often widespread and tenacious. While frontal fogs are to be as much respected as any other type, you are more likely to be aware of them because of the tell-tale presence of accompanying frontal weather.

From weather preparation, we progress to a more tangible form of preparedness, the readiness of the airplane. Pilots let small repairs slide in summer. You may have heard one say, "The carburetor heat knob is off and the oil cooler by-pass is stuck, but I'll get 'em fixed by fall." The best counsel for one holding this viewpoint is, "Change it!" By all means change it by Fall! The margin for flight safety shrinks as the weather grows colder—if you let it shrink.

No engine runs well on faulty fuel. Be doubly sure in winter that strainers are drained. Check fuel source to be sure it is free of moisture. Condensed moisture has a habit of freezing at night in tanks and fuel lines, melting when the engine turns up. Then you have water in the gas. Top off your tanks after every flight so no condensation can occur. In summer, moisture may evaporate. Ice will not.

Not only the engine, but the entire airplane, must get a thorough pre-flight check in winter. Did frost form last night? Check your fuselage and wings. If ice of any kind is present, sweep it off or hangar the plane and melt it off, before flight. Any roughness on the wing surface causes drag, and drag means lost lift. Ice is heavy, too, and a little weighs a lot.

If you melt the ice off your plane, be sure all fittings are reasonably dry, and be sure all hidden areas where water can collect are drained and dry. Check flaps and control surfaces, and work brakes thoroughly to free them of residual slush and water.

During pre-flight warmup, pay particular attention to the cold weather accessories you may need. The pitot heater can be checked by watching the ammeter for a deflection when the heater switch goes on. Check carburetor air temperature for a rise on application of heat. Know your equipment, and how it should respond when properly working. Run adjustable props through their cycle several times. Cycle flaps, trim tabs, and all other movable items, including directional antennae, that might be affected by solidifying moisture.

On the ground en route to the take-off, be alert for winter hazards. Snow and ice may cause brakes to be ineffective. Avoid slippery areas if possible, go slowly if in doubt. Keep the tail down if taxiing into the wind, forward if downwind. A gust, followed by too much brake on an icy runway, can result in a bent prop or worse. When water or mud cannot be avoided, go through it slowly, without stirring it up with slipstream. If you are forced to use power and feel that moisture has been thrown into your control surfaces, flaps, or landing gear, get out and check. Keep a frequent check on brakes. Using them helps to dry them out. If you have retractable gear, be particularly careful about water. It can freeze aloft and jam the lowering mechanism.

In making pre-flight turnup and mag check, choose an area clear behind, and pick a spot where you will not slide forward when you add power. It might be cold in the cockpit, but avoid using cabin heaters until airborne. Carbon monoxide fumes can enter a cockpit on the ground, while in flight they are carried away by slipstream. If your windshield steams up while taxiing, clear it before take-off.

Finally, the best way to find the unique fun of flying in winter is to get out and do it. There is no replacement for experience in any kind of flying. Winter is no exception. So get ready. and when you are ready—go. END

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Hangar Flying

(Continued from page 14)

who walked away from THAT! And we have adopted a new coat-of-arms and motto. Under a prop curled around a rampant stick, is the simple text, "Don't change horses in midstream."

LT. KEITH PHILLIPS, C.A.P.
as told to
BETTY WOOD MCNABB
Panama City, Florida

WITHOUT A PLAN

AFTER WWII, upon returning from overseas, I was made a flight instructor on PT-17's at a primary school at San Angelo, Texas. We had a few AT-6's but the chance to fly one was rare and I was glad to hop one to Liberal, Kan., to deliver an airman. The return trip had to be made at night to fulfill a new requirement on night flying.

I saw no reason for working out a flight plan. The radio compass would do my navigating.

The flight to Liberal was fine and I waited till after sunset to start home—again no flight plan! I filed VFR direct to San Angelo, although I had done no night cross country since cadet days.

Having asked for trouble, I soon found it—a heavy thunderstorm en route near Clarendon. The radio compass spun like a top and the AT-6 shook me loose from any thoughts of navigation. I had all I could do to stay right side up. I even got carb ice and almost lost my power without noticing it.

Finally I did something right. I got turned around and headed out of that storm. But now I was hopelessly lost and the thought of empty tanks began to worry me.

Gradually, the rain stopped and the ceiling lifted until I was again in the clear. I climbed to 10,000 for better visibility and good altitude for bailing. This was going to be my first jump and I wanted plenty of room.

Then, suddenly, as if my prayer was getting VIP service, I saw a green flash on the horizon followed immediately by the split flash of the white beacon identifying a military airfield. I had no idea where it was and did not care. It was a place to land. I tried to act nonchalant as I asked the Lineman the name of the base. He grinned when he said, "Lubbock." He knew I was glad to be there.

As I think back on the incident, I know I authored all my trouble. There was an airway I could have used—not much farther than the direct route. This would have given me definite radio fixes, a light line, a safe minimum altitude and I would have been close enough to the radio stations to get late weather reports.

In addition, I should have made out a flight plan and kept a check on my ground speed. Had I done so, I would not have been fouled up with navigation. Finally, for the night flight into conditions where instrument flight might be required, I should have filed an IFR flight plan.

I've been flying jets now for the past

eight years. They go higher and faster, and the margin for error is much smaller. One thing is sure, before I begin any flight now, it is completely planned before take-off.

MAJOR EDWARD P. MCNEFF
San Bernardino, Calif.

WINDED

THE OCTOBER days in Western Nevada had been bright, clear, and windless—and I hoped that they would continue at least long enough for me to get in my first cross country solo. My instructor assigned me the Yerington-Lovelock-Reno-Yerington triangle and I set out in my 1942 Taylorcraft.

The air was cold and quiet at 6 a.m., the overhead sky bright blue. I gave little thought to the cloud bank in the north. Also, a phone call to Reno for a weather report would have cost me precious gas money. I beat my ETA into Lovelock, though I almost groundlooped the plane landing in a 15 mph cross-wind. The sky was overcast there, but the tower operator didn't say that the weather was going to get any worse. I left for Reno as soon as he signed my log book.

I could tell that the wind was playing hob with my ground speed by watching the cars on Highway 40 below me, but I didn't bother to estimate just how much.

As I came out of the mountains into Carson Valley, I experienced the roughest air I'd ever encountered and found it difficult to lose altitude. But, after several good bumps on the head, I got down to an altitude where the control tower could see me.

I was worried about landing at Reno. The traffic there was dense and the only other time I'd flown to Reno, I'd had my instructor to help me look for other planes. As I flew timidly over the field at 1,000 feet, I was delighted to see that there was not a single moving plane anywhere. What luck! the whole airport to myself! I did notice, however, some dust blowing around the airport but didn't pay much attention to it.

The control tower gave me the green light so I swished down the downwind leg, skidded across the base leg, and struggled into an upwind attitude over the runway. Unfortunately, I didn't know about wheel landings, and when I tried to stall the T-Craft for a 3-point touchdown, the plane went back up. I finally contacted the runway but was back up again for the granddaddy of all bounces. Eventually, I got to the point where I could stay on the ground, except that every time I used power to taxi, I took off again.

As soon as it became evident to the airport mechanics that I wasn't going to get my tail up to taxi, they took pity on me and came out to hold my wings while I taxied into the parking lot. They had their work cut out for them since I had landed at the very end of the strip and had about a 10-foot rollout.

I was informed that the wind was then about 50-55 mph and nearly everything was grounded.

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Pilot? Who, Me?

(Continued from page 41)

cast had given me ample time to get to Detroit.

Strange how fast an hour can pass! Still no familiar check points or landmarks. The map on my lap could have been of east Asia for all the help it was to me. The bubble of panic in my chest grew; it seemed about to burst. Yet I could hardly accept the fact that I was helplessly lost over territory that on the ground I would know very well.

Try a different direction. Left rudder pressure, left wing down; the compass swung slowly, slowly to 90 degrees. 90 degrees! The words were as distinct, the voice as clear as if Chuck had been sitting beside me. "If you're lost," he had said, "fly due east, 90 degrees, until you see the lake. Then take up a heading of 180 degrees and fly until you see Detroit. You can't get lost in Michigan if you remember that."

There! Something indistinct on the horizon. It just might be, yes, it really was the shoreline. I swung to a heading of 180 degrees. Had I ever been over this terrain before? I studied my map, but to no avail. I glanced to the right, then to the left. To the left! It couldn't be, but it certainly was! A large airfield—Selfridge Field. I was practically in my own back yard, in the practice area, and had flown over it many times before.

Detroit should have been in sight. It wasn't. Visibility was way down. I switched on the radio; it was wonderful to hear the familiar voice of the tower operator as he replied to reporting pilots.

"Detroit Tower, Tri-pacer one-three poppa, west of Selfridge," I reported. If the visibility was as bad as it seemed, I wanted other planes to know I was in the area.

"One-three-poppa, report farther in for possible straight-in approach for runway one-five," came the reply. "Possible traffic is an Apache outbound on a northeast heading."

I strained to see any sign of aircraft coming my way. Nothing. Then suddenly over the nose, a plane heading for me. I pushed the nose down and to the right with a violent motion. The Apache winged past me; it was a beautiful sight—nice, too, to know that another human was nearby, if only for a brief instant.

It still seemed quite impossible that I could be so close to Detroit and yet be unable to see it. At long last, I passed over the General Motors Tech Center. The radio had been silent for so long that I wondered if I were the only person flying. I wanted to know whether or not Detroit City Airport was on instruments, that is, did it have less than a 1,000-foot ceiling and three miles visibility. If such were the case, I would be entering a control zone illegally, for I was not qualified on instruments. I had been warned to stay outside of the five-mile radius if I were in doubt. I could land at one of the outlying fields. Violation of the

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CAA regulation could result in a fine, or possibly I would be unable to complete pilot's training. "Detroit Tower, one-three-poppa over the Tech Center," I reported. Complete silence. "One-three-poppa over the Tech Center," I said again.

I moved the radio knob from left to right and back, trying to peak it and pick up a reassuring reply. There was none. Right wing down to make a 360-degree turn, hoping it would help. Another 360-turn, this time to the left. Still no results.

"Detroit Tower, this is one-three-poppa. I am not receiving you. Would you give me a long count, please?" I continued circling and adjusting the knob, all the while watching for other aircraft.

Finally, "——eight, nine, ten. This is Detroit Tower. One-three-poppa, do you read?"

"Affirmative," I acknowledged. "Is the field on instruments?"

"One-three-poppa, Detroit City Airport ceiling 1,100 feet, visibility three miles. Report two miles out on final for straight-in approach for runway one-five."

I relaxed a little and peered into the haze for a sign of the red and white checkered gas tank which seems to sit in the middle of the airport. In a few seconds, I reported my position as two miles out on final.

"One-three-poppa, cleared to land, runway one-five."

It was going to be a low approach. I pushed in the throttle. At last, over the fence, over the runway, nose pointed at the ground losing altitude fast, level out, cut the throttle, settling, settling and, finally, the stall and touchdown. I had come in much too fast, but smoothly, yet again I was shaking from head to foot when I climbed out of the plane.

The reception given me when I walked into the office helped not in the least. The place was full of men. "Where've you been for the last two hours? We were just about to send out a search party."

"If I hadn't stayed here waiting for you, I would have been $70 ahead in a poker game right now." That speaker pulled on his coat and boots and started out the door.

Chuck picked up the phone and dialed a number, "Yeah, she's back. Okay, Doc." I could have cried. Then I looked at the faces which were gradually coming into focus as the men drifted out of the office.

"This'll cost you a cup of coffee," said Chuck. "Come in the restaurant. A storm blew up out of nowhere and should have hit here an hour ago."

So the disgusted faces hadn't been that way at all, only apprehensive. Now I understood. I was glad to buy coffee; I needed it. So did Chuck. He had taught me thoroughly and carefully. Today had been a test of his training. It had been hard on him. He had sweated me out.

"Tomorrow should be a good day. You'll be able to go again. What time will you be out?" he asked.

Tomorrow? Until that moment I had no intention of returning tomorrow or any other day. Then I knew I'd be back. Suddenly I was through the barrier. Achievement was mine.

"I'll be early," I said. END

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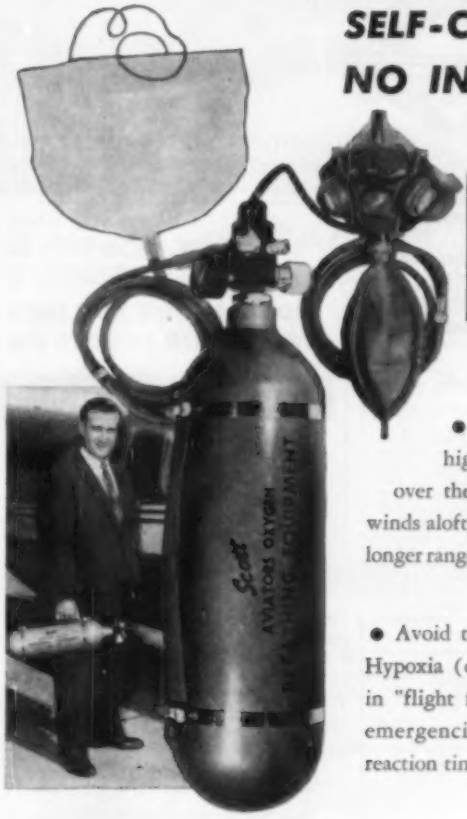

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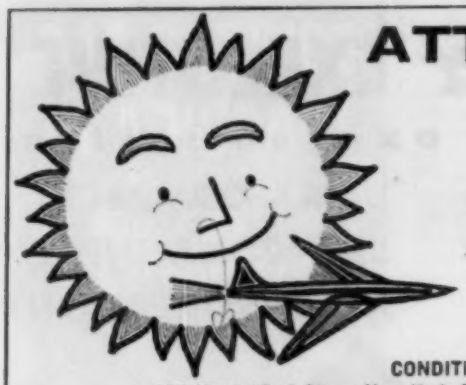

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Flying Down Memory Lane

(Continued from page 39)

hung on a plank and almost popped the pilot's neck. The idea had been to keep the tail up till over it in a landing. It had been a ticklish business, with a short strip and no brakes.

A bit sadly, I got out of the plane to walk around and see if there was anything on the airport I could remember. Then I noticed someone standing by a wing tip. It was one of my old fellow pioneers, "Wig" Wignall, who had been assistant manager at this airport all the time I flew through with the mail. The feeling that had been with me, that I had just dreamed there was an Air Mail Field here, left me. Seeing Wig, I knew it was no dream. We chatted a few minutes and, with his promise to see me in Reno at the Reunion, I took off.

The original Mail Route had not followed the present Airway. I simply stayed on the deck guided by unforgotten landmarks. Past the palisades, on across the barren lands. Frequently along here, an occasional coyote would start up, and though I often tried to chase them with the plane, they'd always dodge me. In the distance was an 11,000-foot mountain where we used to see the brown bears about this time of year. They'd be eating berries and we'd haul out the "45" the Post Office Dept. required us to wear, and blast away from the cockpit. I'm sure I had never come within 50 feet of one but it was fun, and they'd stand up to watch as we flew by. But, no brownies this morning, to my disappointment.

Leaving the bear scene, some 40 to 50 miles on west I came to a spot called Hidden Valley. Lying between two rather high ranges of mountains is a deep meadow floor. I have flown over it hundreds of times, but never had a chance to go down and really examine it. Now I did. As I passed over the sharp-backed range on the east side, I looked straight down. Yes, it looked as it did the last time I saw it. Monty Mouton had motor trouble and landed down there once. He said it was 70 or 80 miles by trail to the nearest community. The valley is six or eight miles long by about three miles wide. Lowering the undercarriage and flaps, I slid steeply down 6,000 feet, reaching bottom at about 4,000. Raising the undercarriage and flaps, I flew by the ranch buildings. What a lovely place. Big ranch house, outbuildings, fences and corrals all of stone. Old and weather-beaten, but well preserved. Several horses were tied to the corral fence. Turning around, I flew by again as low and slowly as I could, almost looking for bad men with big six shooters to start popping from behind the rock walls and fences. It was such a setting as only Zane Grey could describe. Large fields of forage were irrigated from the spring on the western slope, whence a good stream of water poured down the mountain side. There were no wagons, autos, nor ever a road, for the mountains surrounding are over a mile high and very steep. What an utterly lonely place it is.

Climbing steeply, I soon passed over the western rim of mountains and started

looking for a vee in the next range of mountains. Soon spotting it, I started losing altitude so as to thread the gorge at a few hundred feet. As I passed through the rather narrow canyon, I looked for the cave up in the wall, on the left hand side. Not seeing it, I turned around and came back. Yes, there it was, although the roof had fallen in and half-filled the opening. How well I remember when sometimes I'd pass low through here, I'd see a little old man sitting on a boulder in the cave's opening. He had long white whiskers. It seemed to me that he would wave his hand wearily as I passed by. I'd wonder how he got in the cave, for the wall was very sheer and hundreds of feet to the top and bottom. The old man was gone now.

Then on to Carson Sink. As I approached that barren desert, I remembered seeing once in a while small bands of wild horses. How they did take off when I dived on them, and how mad it made the stallion when I'd scatter his harem. Climbing, I could see across Carson Sink and, closing my eyes, recall those hundreds of "sand devils" marching across the waste. In mid-afternoon during July and August, they would be 2 or 3,000 feet tall, and as thick as a forest. The tops would spread out in a hazy ball, like great palm trees. Looking over to the right, Lake Winnemucca, which had been ten or twelve miles long and three or four wide the last time I saw it, was now a dry sandy waste with just a small puddle of water in the middle. Over that range of low hills, Lake Pyramid had grown smaller too, but still appeared to be ten miles long by three wide.

On up Truckee River Canyon, and I was over Reno. Only some 17,000 inhabitants when I lived there, it is now a real city. The airport then, south of town several miles, like Elko, had had a wooden bridge across the east-west runway. But Reno had grown way past where the airport was. As I looked for the site of that old field, I decided the golf links had engulfed it.

I circled and landed. This had been my most wonderful journey in many years. Every foot of that 440 miles recalled things priceless to my memory. END

"Joe missed the landing strip again!"

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I Learned About Flying From That!

(Continued from page 52)

at the rudder as I pressed the pedals and moved the wheel back and forth to check the elevators. The wheel moved the ailerons freely. She seemed okay.

I eased in power and started a cautious, normal take-off run.

At about 80 mph, I felt her off the ground. She flew off nicely and I held her a few feet off the ground to accumulate a good flying speed before climbing.

The air this day was choppy at take-off and, as I was ready to start my climb, the left wing dipped into a bump.

Automatically, I corrected with right wheel and rudder, started adjusting prop and power but the wing continued down. I did the natural thing—applied right wheel and rudder to bring it up. By now, in much less time than it takes to read this, she was getting into a steeper and steeper wing-down condition. As I applied still more right wheel, I was finding it necessary to carry nearly full right rudder to help the wing up and keep my heading. With the bank increasing, I still applied right aileron and full rudder. There was no time to analyze what was happening. I was intent only on getting that wing up.

All I knew in these few seconds of flying was that the plane was in a violent slip, a few feet off the ground with take-off power pulling me along.

Suddenly, with wheel full over to the right and rudder full in, the left wing tip struck the ground a glancing blow. My flying speed threw the wing up a few feet, and the nose swerved to the right about 30 degrees.

In that split second when the wing tip struck the ground, and bounced up, thereby helping me decrease the bank, I made a decision. With about a quarter of the airport still ahead of me I chopped the power and she settled in on the left wheel and skidded along the wet grass. I remember a large plume of mud and grass cascading outward from the left wheel as the plane careened. I was fast running out of airport and if I could not get her on the other wheel and braked, I was headed for a fence, a gravel road, and into a brickyard dead ahead.

Working the left brake to straighten her out, the plane slowly righted itself and settled onto both wheels and skidded to a stop—inside the airport and right side up!

When I got down out of the plane, I could hardly believe both the plane and I could be okay!

While standing there wondering at what happened, my friends and hangar crew came dashing out. I gave them a blow by blow description of what had happened.

"Well, nothing can be wrong with the airplane," the shop foreman said. "It was okay and even the inspector cleared her as airworthy yesterday."

I replied, "Listen, I flew this airplane in here from Arkansas and she was alright, but something is wrong now and we'd better find out what it is."

Another pilot, one who had stationed

himself on the airport to get a picture of the take-off, said, "You say when your left wing was down you applied full right wheel and rudder?"

"That's right," I said, "but she kept going down."

He said, "When you went by me your right aileron was all the way down."

The shop foreman and I looked at each other, I climbed into the cabin, moved the wheel and discovered that the wheel and ailerons were hooked up backwards!

It was then I got the story of the attempt to take the wing off. Apparently, a helper had re-connected it and everyone assumed it was okay!

But, nobody had checked to see that the controls were working correctly.

As for me—I did not care to blame anyone—I was a lucky guy! I was partly at fault for not checking the direction of aileron movement, but I had no idea they had been disconnected in the first place.

When I added up the experience, instead of being killed and smashing the plane, the worst that happened was a wiped-off navigation light and a bent wing bow—and me a lot wiser! It taught me never to take off without checking the correct action of the controls. I learned about flying from that. END

Have You Read?

(Continued from page 16)

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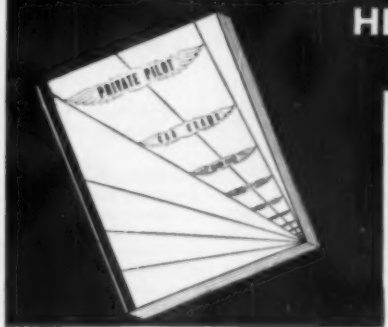

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Jan. 29-31 — Fourth Annual Meeting, American Astronautical Society, New York, N. Y.

Jan. 30-31—7th Annual Instrument Short Course. LA Harbor College, Wilmington, Calif.

Feb. 3, 4—Flight Control—Panel Integration Symposium at the Biltmore Hotel, Dayton, Ohio, sponsored by USAF with the assistance of the Cook Research Laboratories, Morton Grove, Ill. For additional information and reservations, write to Mr. John H. Kearns, Box 942, Dayton, Ohio. There are no charges for the symposium sessions.

Feb. 16-18—Seventh Annual Ag. Conference, Texas A. & M., College Station, Tex.

Feb. (late)—8th Idaho Aerial Tour of Mexico. Idaho Dept. of Aeronautics, Boise Municipal Airport, Rte. 5, Box 5, Boise.

March 13-21—Fourth Annual Miami-Cuba Air Cruise sponsored by Florida Aero Club which will also include a flight to Haiti and Jamaica. Write Harry B. Collins, Air Cruise Director, 375 N.E. 154th St., North Miami, Fla.

March 13-14—2nd National Conference on Aviation Education, Hotel Mayflower, Washington, D. C.

March 17-21—1958 Nuclear Congress, managed by American Institute of Chemical Engineers, 25 West 45th St., New York 36, N. Y.

March 17-21—Aviation Division Conference, American Society of Mechanical Engineers, Statler-Hilton Hotel, Dallas, Tex.

April 1 — (Approximate date) Annual Spring Clinical Session of Flying Physicians at Phoenix, Ariz. Dr. L. D. Beck, 1626 North Central Ave., Phoenix, Ariz.

April 16-19—American Helicopter Society 14th Annual National Forum, Sheraton Park Hotel, Washington, D. C.

Calendar items must be received at FLYING's editorial offices, 1 Park Avenue, New York 16, N. Y., three months prior to the event.

PLEASE NOTE A CORRECTION

A line was lost and a word misplaced in the printing of Mr. Elston Swanson's important article, "Radio Frequencies," in November FLYING. *Please change beginning with line three, second paragraph from bottom, page 42, to read: "There are VHF frequencies which may be used simplex (i.e., transmission and reception are* both *on the same frequency) or duplex (where transmission and reception are* not *on the same frequency)."*

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"WINEMAKING: Beer, Ale Brewing." Illustrated. $2.00. Eaton Books, Box 1242-Y, Santa Rosa, California.

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(Continued from page 10)

yellow powder in a paper bag at the leak in Deadeye Dick-fashion and the powder's colorful splash clearly marks the telltale patches of oil.

USING A BELL 47-J "Ranger" helicopter, the Briles Manufacturing Co., El Segundo, Calif., has completed an ambitious five-weeks' sales tour covering 8,000 miles and 16 cities across the nation. The firm, manufacturers of aircraft fasteners, demonstrated to prospective customers its new super-strength, bolt-wrenching recess Multitork fastener designed for high-speed aircraft, rockets and missiles. Left to right are Max De Zemplen, sales manager; Paul R. Briles, president; F. S. Briles, vice-president, and John Simone, pilot.

WITH CAA APPROVAL, a Vortac facility, the newest radio aid to aerial navigation, is being installed at University of Illinois Airport, Urbana, Ill., said to be the busiest airport away from the Chicago area. CAA is planning to establish a control tower at the university and a new administration building is also planned. Both Vortac and control tower facilities to be operated by CAA should be in operation by mid-1958.

WILLIAM H. BLACK, 2nd Lieutenant USAF, instructor-pilot at Reese AFB, Tex., looks thoughtful as he contemplates the results of three years' spare-time work put into the making of a working-model

of a 1,600 hp Wright engine. Before him are 14 miniature engine pistons perched atop a full-size piston. When the engine is completed, Lt. Black will have the only Wright 1,600 of its size, and will have to build a special plane to fit the engine.

COL. JOHN P. STAPP, USAF, chief of the aero medical field laboratory at Holloman AFB, N. M., has been awarded the 1957 Gorgas Medal for his studies to determine the maximum limits of emotional and physical shock that the human body can stand. Established in 1942 by Wyeth Laboratories in Philadelphia, the award consists of a silver medal, a scroll and an honorarium of $500.

FUN TO SHOW at any gathering—and instructive too—is "Wings for Beginners," a new film produced for Piper Aircraft by Ted Ward, and available on loan through the former. Setting for the film is delightful Edgartown on the Island of Martha's Vineyard off Massachusetts shores.

THE LARGEST electronics contract in CAA history—an $11.4 million contract—has been placed with I.T. & T.'s Division, Federal Telephone and Radio Co., for VOR-TAC system ground beacons and test, monitor and control equipment. This is the first direct CAA large-scale procurement of ground equipment for VORTAC. Contract calls for delivery within 27 months.

FROM CHAIRMAN OF THE BOARD on down, five officials of the Victoria Bank and Trust Co., of Victoria, Tex. look upon their company plane, this Cessna 182, as a workhorse for company business. All fly the plane, which is the bank's third

purchase. Left to right, the banker-pilots are: Mr. Wes Simmons, bank appraiser; R. D. Blackburn, president; Charles Hanley, v. p. of the business development department; D. E. Blackburn, board chairman; and Roger Hamel, v. p. of the oil and gas department.

EIGHTEENTH edition of "Civil Air Regulations & Flight Standards for Pilots" is available from the publisher, Aero Publishers, Inc., 2162 Sunset Blvd., Los Angeles 25, Calif., or book stores, airport operators and aviation supply dealers for $2.25. A much larger volume (160 pages) this edition features, along with other pertinent information, the new "Cross-Country Typical Examination for Private Pilots."

OVER HALF of the civil aircraft registered in the U. S. are ten years old, according to a study recently published by CAA under the title "Statistical Study of U. S. Civil Aircraft as of Jan. 1, 1957." Showing 58 per cent of these aircraft manufactured prior to 1948, the study lists 87,531 registered aircraft (an increase of 2,211 over the previous year) of which 64,688 hold current CAA airworthiness certificates. It is noteworthy that the DC-3, discontinued by Douglas in 1945, accounts for over 20 per cent of the U. S. air carrier fleet.

ONE OF 80 TEACHERS participating in a 12-week air age workshop given by the Nassau (L. I.) group, Civil Air Patrol, Doris Renninger, E. Norwich, L. I., gets an orientation flight in a 514th Troop

Carrier Wing C-119 from Mitchel to Suffolk Co. AFB. A pilot herself—but no C-119 pilot—Miss Renninger gets a cockpit checkout from co-pilot Edmond Rossi, USAFR, a Long Island neighbor. To date, over 300 teachers have been graduated from these workshops.

RECENTLY PUBLISHED by CAA is a useful reference document called "The CAA Story." The booklet, prepared primarily for CAA recruiting, new employee orientation and public information, is brief and to the point. Copies are available from CAA in Washington and regional offices.

SOARING SOCIETIES from the U.S.A., Britain and the USSR are among the 19 countries who have to date accepted the Polish Aero Club's invitation to participate in the 1958 World Gliding Championships at Leszno. Four pilots from each country may compete in the contest which will be held from June 15 to 29.

A LINE of self-sticking pre-cut letters suitable for the permanent marking of aircraft has been announced by Regal Air Corp., 500 Fifth Ave., New York 18,

N. Y. Called "Regaletters" they come in seven colors and six sizes (4" to 24"), conform to CAA regulations and are guaranteed for a minimum of three years. They are available from all leading aircraft distributors.

FRENCH BALLOONIST Georges Cormier, holder of the French distance record for free flight in a balloon, 810 kilometers (506 miles), made his 530th and last flight several weeks ago at Cholet, France. On his 530th flight a sudden gust of wind caught the balloon near the ground on ascent, causing him fatal injuries. Mr. Cormier was 83 years of age.

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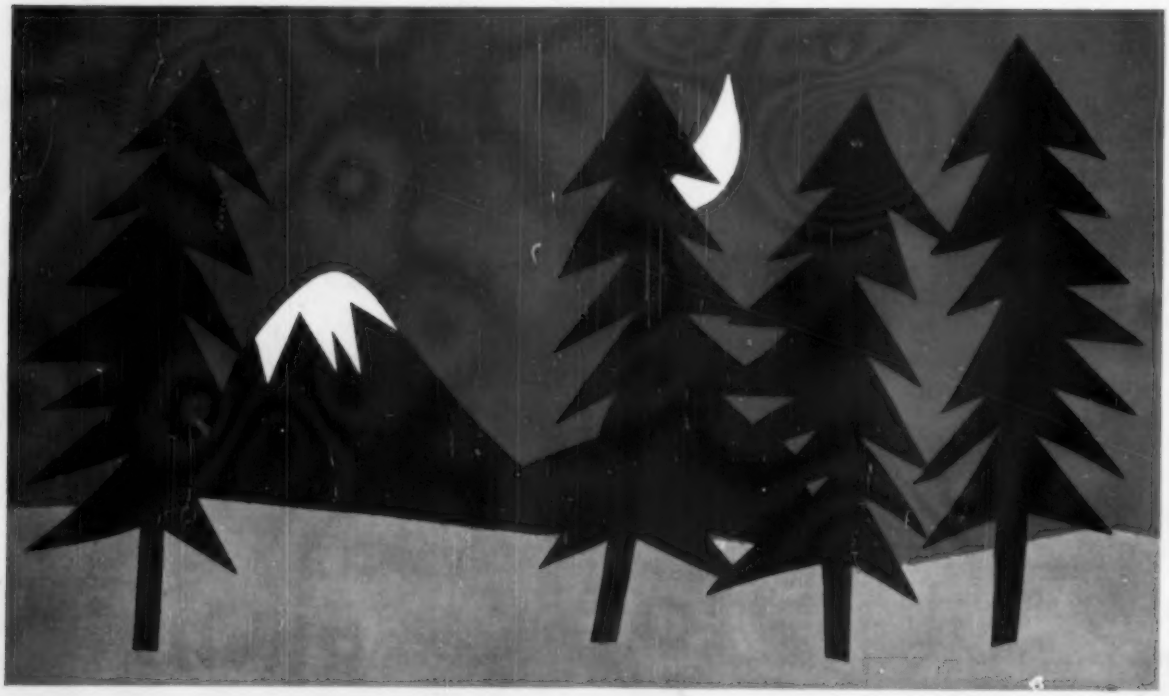
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